PB88-106505

# Superfund Record of Decision (EPA Region 6) Bayou Sorrel, Louisiana, November 1986 First Remedial Action

(U.S.) Environmental Protection Agency
Washington, DC

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U.S. Department of Commerce
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United States
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Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R06-87/016
November 1986

PB88-106505

EPA

# Superfund Record of Decision:

## Bayou Sorrel, LA

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16. ABSTRACT

The Bayou Sorrel site is located in Iberville Parish, Louisiana approximately 20 miles southwest of Baton Rouge, LA. Fifty acres of the 265-acre site have been used for waste disposal. The waste disposal areas consist of four landfills: a spent lime cell, a crushed drum cell, four covered liquid waste ponds, and a land farm. The remaining acres are covered by dense brush and trees. The entire site has a marshy, bayou-type environment and is prone to flooding and poor drainage. Early in 1977, the Environmental Purification Advancement Corporation (EPAC) began operating the Bayou Sorrel site. A sister firm, Clean Land Air Water, Inc. (CLAW) operated an injection well approximately six miles south of the site. EPAC operations included landfarming, open liquid impoundments, drum burial and landfilling of chemically fixated wastes. The fixation process is unknown but may have included lime, cement, and native soils. EPAC and CLAW were two separate operations, however, it was suggested that wastes from the injection well were diverted to EPAC when process problems at the well caused a bottleneck. In the summer of 1978, a truck driver died at the site. It is suspected he died as a result of inhaling hydrogen sulfide gas created when liquid wastes were dumped into the receiving pond. State and Federal regulatory officials inspected the site following this incident. Unknown materials were found in large, open unpermitted ponds and the site was ordered closed. Approximately 36,400 cubic yards of wastes remain
(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

| a. DESCRIPTORS | b. IDENTIFIERS/OPEN ENDED TERMS | c. COSATI Field/Group |
|---|---|---|
| Record of Decision<br>Bayou Sorrel, LA<br>First Remedial Action<br>Contaminated Media: gw, surface soils,<br>Key contaminants: hydrogen sulfide, pesticides,<br>herbicides, organics, VOCs | | |

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Bayou Sorrel, LA
First Remedial Action

16. ABSTRACT (continued)

onsite following the September 1978 closure activities. The primary contaminants of concern include: sulfide wastes; process wastes from pesticide/herbicide manufacture; and spent wash solutions. Some localized surface soil contamination with herbicides and other organic compounds was found at the south end of the site.

The selected remedial action includes: regrading the site to control runoff, limit cap erosion, limit surface water ponding and divert storm water from waste areas; covering former disposal areas with RCRA top-soil/geomembrane/clay caps; installing a sand/geofabric pore water drainage layer above the wastes and below the cap, and including a venting system to reduce buildup of methane and other gases beneath the cap; consolidating all miscellaneous wastes outside currently capped areas under the new caps for grading and fill purposes or disposing of wastes at an offsite facility; installing a 30-feet deep slurry wall around the former landfill area and constructing a shallow slurry wall around the former Pond 4 area; fencing all capped areas to restrict access to disposal areas and constructing gravel access roads around fenced areas to allow continued recreational use of adjacent lands and borrow lake while diverting traffic around and away from the disposal areas; and installing a ground water monitoring system. The estimated capital cost for this remedy is $23,200,000. Annual O&M costs were not specified.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

# RECORD OF DECISION

## Site

Bayou Sorrel Site located in Iberville Parish, Louisiana, approximately 6 miles north of Bayou Sorrel, Louisiana.

## DOCUMENTS REVIEWED

I am basing my decision primarily on the following documents describing the analysis of the cost and effectiveness of the Remedial Alternatives for the Bayou Sorrel site.

Environmental Protection Agency, 1985. "Remedial Investigation Report, Bayou Sorrel Site, Bayou Sorrel, Louisiana." Volumes I and II. Prepared by $CH_2M$ Hill.

Environmental Protection Agency, 1986. "Endangerment Assessment, Bayou Sorrel Site, Bayou Sorrel, Louisiana." Prepared by Life Systems, Inc.

Environmental Protection Agency, 1986. "Feasibility Study Report, Bayou Sorrel Site, Bayou Sorrel, Louisiana." Prepared by $CH_2M$ Hill and SRW, Inc.

Summary of Remedial Alternative Selection (Attached)

Summary of Public Comments Received During Public Comment Period and Agency Response (Attached)

## DESCRIPTION OF THE REMEDY

The Feasibility Study evaluated alternative treatment technologies including incineration and biological treatment. These technologies were not retained due to engineering impracticability (a detailed discussion can be found in the Summary of Remedial Alternative Selection).

- Regrading of the site to control runoff, limit cap erosion, limit surface water ponding and divert storm water from waste areas.

- Former disposal areas will be covered with RCRA top-soil/geomembrane/clay caps

- A sand/geofabric pore water drainage layer will be installed above the wastes and below the cap. This layer will be connected to a system of pipes, manholes, pumps and tanks which will collect and store the liquids from this drainage layer.

- A venting system will be included in the cap to reduce the buildup of methane and other gases beneath the cap.

- All miscellaneous wastes outside currently capped areas would be consolidated under the new caps for grading and fill purposes or disposed of at an off-site facility.

- A slurry wall approximately 30 feet deep (actual depth to be determined during final design) would be installed around the former landfill area. Also, a shallow slurry wall will be constructed around the former pond 4 area.

- All capped areas will be fenced to restrict access to disposal areas. Gravel access roads will be constructed around fenced areas to allow continued recreational use of adjacent lands and borrow lake while diverting traffic around and away from the disposal areas.

- Installation of a groundwater monitoring system to monitor the effectiveness of the remedy.

## Decision

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and the National Oil and Hazardous Substances Contingency Plan (40 CFR Part 300), I select the remedy described above for the Bayou Sorrel site. I have determined that this remedy is cost-effective and is protective of public health and welfare and the environment. The action will require operation and maintenance to maintain the effectiveness of the remedy. Since wastes will be left on-site, the remedial action will be reviewed every five years to assure that the remedy is still protecting public health and the environment. The State of Louisiana has been consulted on the remedy. I have considered Section 121 of the Superfund Amendments and Reauthorization Act of 1986 (SARA), including the cleanup standards thereof, and certify that the portion of the remedial action covered by this Record of Decision (ROD) complies to the maximum extent practicable with Section 121 of CERCLA (as amended by Section 121 of SARA).

///

If negotiations are successful, potentially responsible parties (PRPs) will enter into a Consent Decree with EPA authorizing the PRPs to implement the remedial action. In the event that negotiations are unsuccessful, litigation will be pursued by EPA and the Department of Justice in an effort to secure performance of the remedial actions.

11. 14. 1986
Date

Frances E. Phillips
Acting Regional Administrator

Summary of Remedial Alternative Selection

BAYOU SORREL SITE
Iberville Parish, Louisiana
March 1986

## Site Location and Description

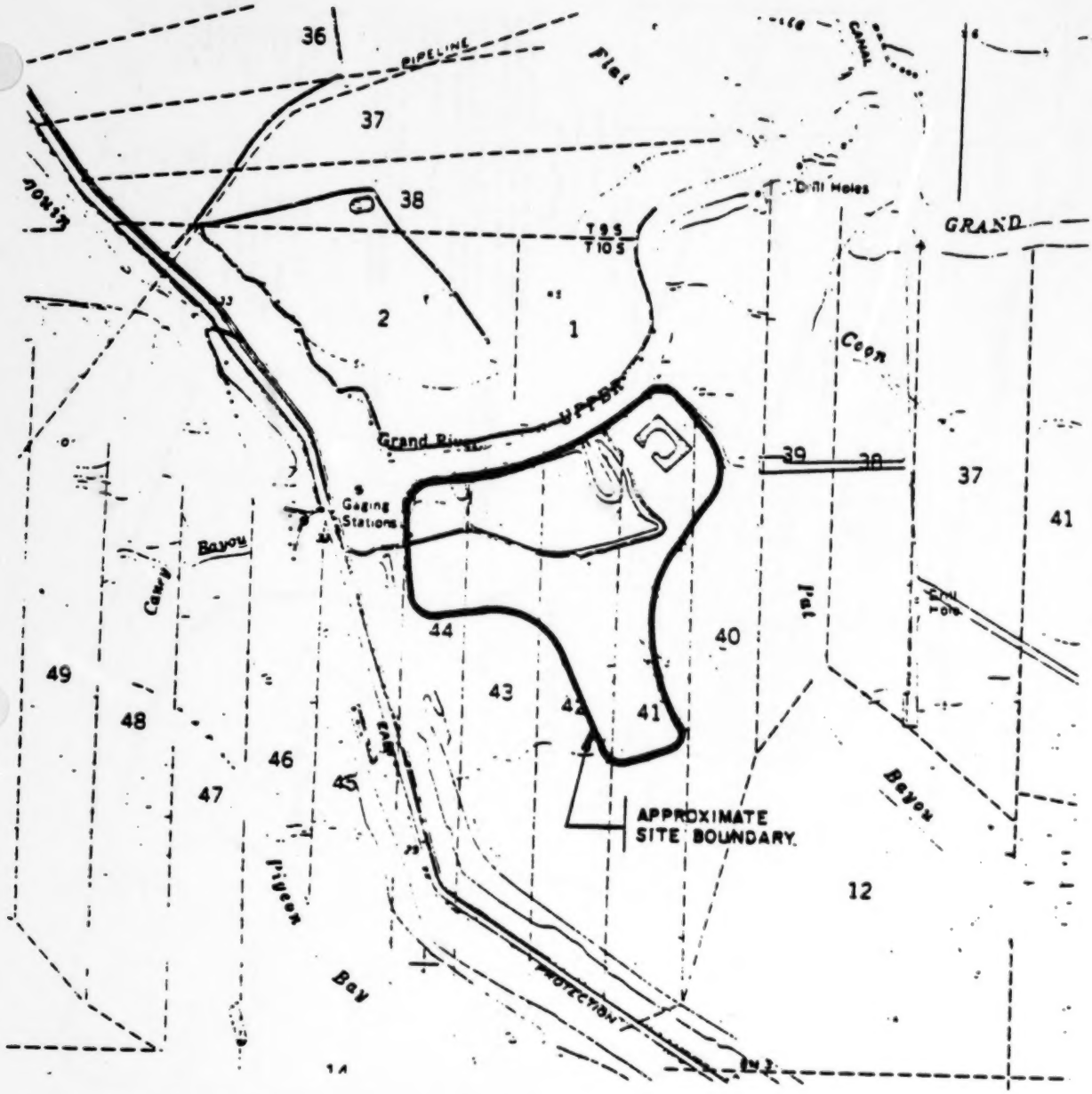
The Bayou Sorrel Site is located in Iberville Parish, Louisiana, approximately 20 miles southwest of Baton Rouge, Louisiana, about six miles northwest of the town of Bayou Sorrel (Figure 1). The west border of the site is bound by a man-made drainage feature called "Borrow River". About 100 yards west of Borrow River is the Atchafalaya Basin Protection Levee, while the north and east sides of the site are bound by the Upper Grand River and Pat Bayou, respectively. Undeveloped swamp land is adjacent to the site on the south (Figure 1). Access to the site from the north is along the unpaved levee road 14 miles south of its intersection with Interstate 10 at Ramah, Louisiana, while access from the south is along the same unpaved levee road six miles north of the town of Bayou Sorrel. The Upper Grand River provides barge access to the site.

The Bayou Sorrel Site, as shown on Figure 2 is a "T" shaped, relatively flat parcel of land encompassing about 265 acres. Approximately 50 of the 265 acres were actually used for waste disposal. The waste disposal areas consist of four landfills including the spent lime cell and the crushed drum cell, four covered liquid waste ponds, and one land farm. All of the disposal areas have been covered with natural soils and contoured as part of the Louisiana DNR regulated closure of the site in 1978 and 1979. Ponds 1,2 and 3 and Landfills 1 and 2 are shown on Figure 2. These disposal areas are characterized by their slightly mounded soil caps which have scattered areas without vegetation. Pond 4 exhibits a very distinguishable soil cap. A 50 acre lake and one acre pond, probably former borrow pits, are situated along the north border of the site.

Apart from disposal areas, the site is generally covered by dense brush and trees. The site (particularly the south end) and surrounding areas can best be described as having marshy bayou-type environment and are prone to periodic flooding and poor drainage.

## Site History

The Bayou Sorrel Site began operation in early 1977. It was operated by Environmental Purification Advancement Corporation (EPAC). A sister firm, CLAW, Inc. (Clean Land Air Water) operated an injection well approximately six miles south of the site, in the town of Bayou Sorrel. That well is still operated, presently by others not associated with the former operation of the Bayou Sorrel Site.




SOURCE: (1) U.S.G.S. 7.5' Topographic Map Grand Lake, Quadrangle, Louisiana, Dated: 1969, Photo-revised: 1980, Scale: 1" = 2,000'.

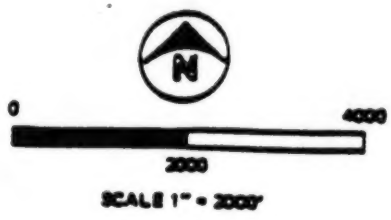



FIGURE 1

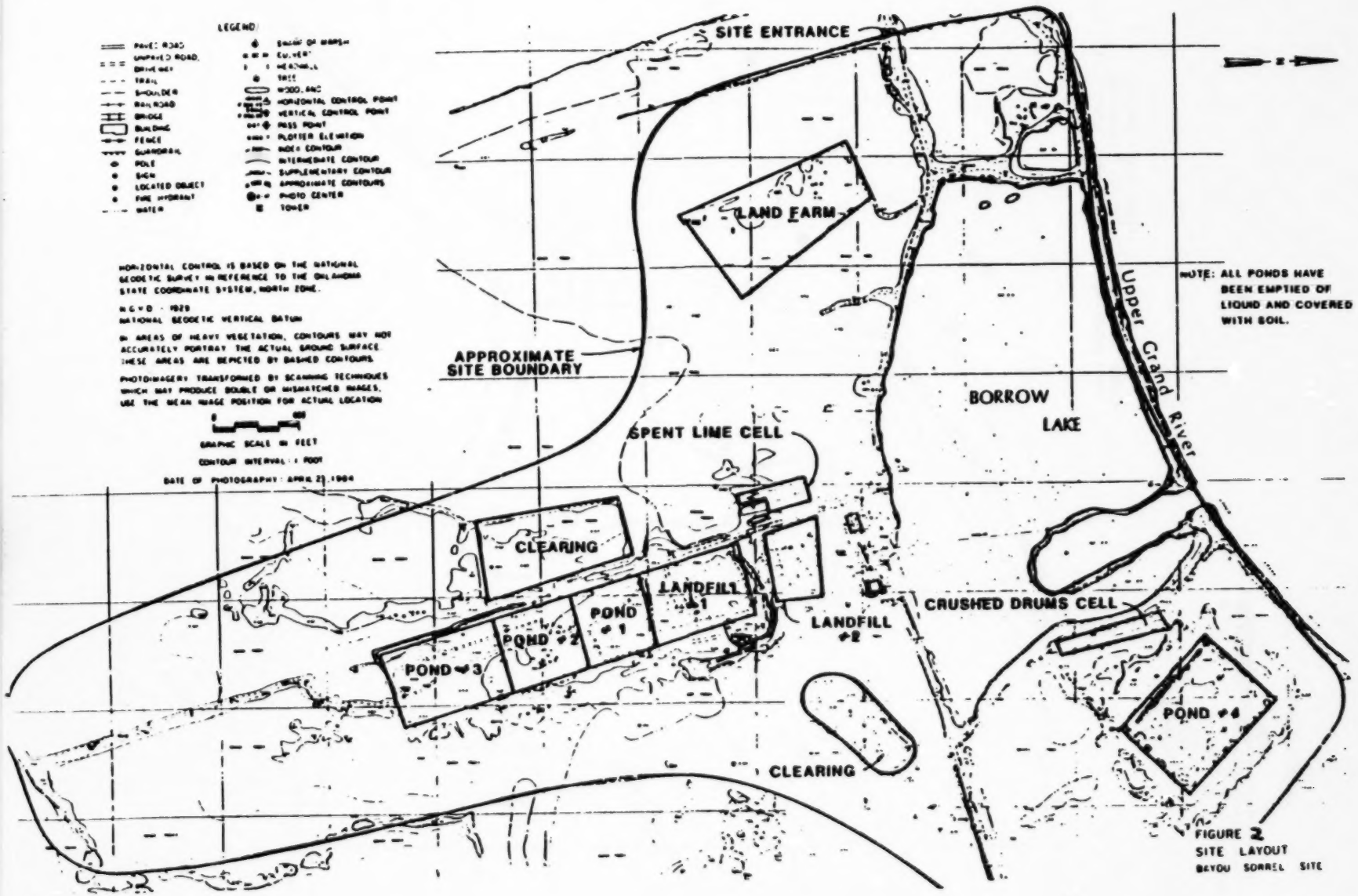



FIGURE 2
SITE LAYOUT
BAYOU SORREL SITE

EPAC operations included landfarming, open liquid impoundments, drum burial, and landfilling of "chemically fixated" wastes. Louisiana Department of Environmental Quality (LDEQ) officials report that all of these except the open pond were permitted by the State. The fixation process is unknown but may have included lime, cement, and native soils. EPAC was supposedly a separate operation from CLAW. However, court testimony by former employees suggests that wastes were diverted from the injection well to the EPAC site when process problems at the well caused a bottleneck. Therefore, both injection-well waste records and EPAC records were included in summarizing wastes possibly present at the site.

In the summer of 1978, a truck driver died at the site. The coroner's report stated the likely cause of death as hydrogen sulfide inhalation. Apparently the liquid wastes he was unloading were incompatible with wastes in the receiving pond, thus creating hydrogen sulfide gas. State and Federal regulatory officials inspected the site following the above incident. The investigation revealed the presence of large open, unpermitted ponds containing unknown materials. As a result of the governmental investigation, the 18th Judicial District Court ordered the closure of the site to eliminate all health hazards.

Closure activities began in September 1978, and were overseen by the State. Closure activities consisted of the following:

1. Dewatering by spray evaporation

2. Transfer of residues from Ponds 1 through 3 to Pond 4 (LDEQ officials report that this activity may have been a partial removal only).

3. Filling in the ponds with native soils and an admixture to Pond 4.

4. Contouring the filled ponds.

During the transfer of material to Pond 4 from Ponds 1-3, there may have been some spill-over of material to the periphery of Pond 4. Closure activities were completed in the spring of 1979, and the site was placed on inactive status by EPA later that year. The quantity of wastes remaining on site was estimated to be 1 million cubic feet (36,400 cubic yards) (RI report).

After closure, the State received complaints about odor and surface contamination in the swamp south of the site. The State contracted Resource Technology, Inc. in 1981 for a preliminary site investigation, and a further investigation by Woodward-Clyde Consultants was completed in 1982. These studies included installation of a total of 12 groundwater monitoring wells, although only three of these were sampled. Groundwater data were inconclusive. Some evidence of surface pesticide contamination was also collected.

Based on the information obtained during these site investigations, the Bayou Sorrel Site was added to the National Priority List of Superfund sites on December 20, 1982. The listing action provided the mechanism for the Environmental Protection Agency (EPA) to perform a Remedial Investigation (RI) to determine the nature and extent of wastes at the site.

The final Remedial Investigation Report was completed in December 1985, and the Feasibility Study Report completed in February 1986.

## Current Site Status

The Remedial Investigation (RI) field activities at the Bayou Sorrel site were conducted in two phases. Phase I activities from March to May 1984 included collecting groundwater, surface water, sediment, soil, and biological samples. Phase II activities were conducted in March 1985 and consisted of resampling of onsite monitoring wells.

The results of the RI along with reviews of site operating records, State files and Potentially Responsible Parties (PRP) 104(e) responses allowed the site to be characterized in terms of:

- Wastes present
- magnitude and extent of contamination;
- rate and direction of waste migration;
- target receptors including population at risk, threatened resources, and sensitive ecosystems;
- site geology, and
- site surface water and ground water hydrology.

The following is a summary of the site investigation. The top stratum of the site is approximately 70 feet thick and consist mainly of silts and clays with hydraulic conductivity ranging from $10^{-8}$ to $10^{-4}$ cm/sec. One lenticular silt sand bed has been identified within the top stratum with hydraulic conductivity ranging from $10^{-5}$ to $10^{-3}$ cm/sec.

Beneath the top stratum are thick deposits of sand, gravel, and silt which may extend to 700 feet below land surface. These coarser sediments comprise the only regional aquifer in the parish and are referred to as the Plaquemine aquifer. Groundwater withdrawals from the Plaquemine aquifer in the vicinity of the site are minimal due to the low population density and marginal groundwater quality. The Office of Public Works of the Department of the State of Louisiana maintains a computer file of water wells in the area including those wells on file by the U. S. Geological Survey. This inventory shows no wells within two miles of the waste site. ERM-Southwest (1984) conducted a field survey of water wells and located two wells within a two-mile radius of the site. These wells were used at local fishing camps for washing only and not for potable supply. Water sample analyses from these two wells exhibited poor water quality with TDS of about 2,000 mg/l, most of which was dissolved chlorides at about 1,000 mg/l.

The Plaquemine aquifer is hydraulically connected to the main channel of the Mississippi River which cuts through the confining top stratum. Stage fluctuation in the river controls head distributions and consequently flow direction in the aquifer. During most of the year, heads in the aquifer are above land surface in the vicinity of the site.

The primary surface water features in the area include the following:

- The Upper Grand River which borders the Bayou Sorrel Site on the north and flows to the west and empties into an unnamed borrow river which flows to the south. The borrow river borders the site on the west.

- Pat Bayou borders the Bayou Sorrel site on the east and drains in a southerly direction into Pat Bayou.

- The southern portion of the site is bordered by back water swamp which covers portions of the site much of the year.

- There are an unnamed borrow lake (approximately 50 acres) and pond (approximately 1 acre) located on the northern portion of the site.

None of these features appear to have been impacted by the Bayou Sorrel site. Runoff generally flows to the south and east, mostly to Pat Bayou and from there to Pat Bay. Most of the site would be inundated by the 100 year flood caused by backwater from the Borrow River and Upper Grand River.

To evaluate the nature and distribution of waste at the site, soil and core samples, groundwater samples, surface water samples, sediment samples, and biological samples were collected for laboratory analyses. Based on 104(e) responses and other site records, wastes disposed at the site during its active life were of the following types:

- Process wastes from pesticide/herbicide manufacture; these include distillation residues, contaminated packaging, and miscellaneous wastes;

- Sulfide-containing wastes (scrubber blowdown and spent caustic) from hydrocarbon processing and exploration activity;

- Spent wash solutions from boiler-cleaning and process equipment-cleaning contractors.

The relative quantities of wastes disposed of at the site is unknown, but the total quantity was estimated to be approximately 1,000,000 $ft^3$ from Louisiana Department of Natural Resources files.

Some localized surface soil contamination has been found at the site, especially at the south end of the site. This contamination includes herbicide and other organic compounds. Some waste materials, including some which may liberate hydrogen sulfide gas, were found under a thin layer of soil outside of the capped area over pond number 4. Similar wastes are found in pond 4 itself.

During the 1978-79 closure activities the volume of on-site ponds was reduced by enchanced evaporation and landfarming of the pond supernatant. The remaining contents were then solidified with soil and other additives, and the ponds were covered with on-site soil. Because of these closure techniques, there is estimated to be close to 1,000,000 $yd^3$ of contaminated soil and waste at the site.

Some inconsistent data indicate the possibility of organic contamination of shallow groundwater but at very low levels. No organic constituents were noted in GC/MS analyses of samples from the Plaquemine aquifer beneath the site, except for a single unknown compound at 12ppb from a sample from well 11-D. Contamination of this aquifer by the site appears very unlikely due to the upward hydraulic gradient.

Organic compounds were reported from seven onsite shallow wells for compounds not readily explainable as being derived from laboratory contamination or well construction materials. All of the reported compounds are either reported at very low ppb levels, were present in laboratory blanks at low levels, and/or were not detected in duplicate samples or analyses by ERM-Southwest.

In a study completed in November 1984, by the Bayou Sorrel Task Force (BSTF), 30 buildings were located within two miles of the site. Only three of these buildings were found to be year-round residences. Most buildings in the area are hunting or fishing camps. The closest community to the site is the town of Bayou Sorrel, approximately six miles southeast of the site.

The population potentially at risk is:

- Hunters or fishermen at or near the site.
- Petrochemical workers using the site to gain access to their wells.

## Enforcement

State and Federal regulatory officials inspected the Bayou Sorrel site following the death of a truck driver at the site in the summer of 1978. The inspection revealed the presence of large, open, unpermitted ponds containing unknown materials.

As a result of the governmental investigation, the 18th Judicial District Court ordered the closure of the site to eliminate all health hazards.

In the fall of 1982, EPA identified approximately 20 Potentially Responsible Parties (PRPs) for the Bayou Sorrel site. These 20 PRPs were notified of their potential liability and offered the opportunity to participate in remedial activities. In the spring of 1983, approximately 70 additional PRPs were identified and also sent notice letters. None of the PRPs would agree to conduct the necessary studies and implement the resultant remedial activities that were identified by these studies. A group of PRPs did, however, offer to conduct the Remedial Investigation and Feasibility Study (RI/FS) at the site but would not agree "up-front" to implement the selected remedy.

Independent of the EPA investigation, representatives of the PRPs began remedial investigation activities in October 1983. The PRP activities are described in other reports. To the extent possible, the EPA activities were coordinated with those of the PRP's to minimize duplication of effort.

A FS completed by the Bayou Sorrel Task Force in February 1985, recommended a remedy similar to EPA's clay cap alternative, which the PRPs offered to implement.

## Alternatives Evaluation

Site specific remedial objectives were established prior to the collection of RI data for the receptor media indentified at the site. The FS developed by CH2M Hill and SRW Inc. developed these objectives which follow:

- Minimize the threat to public health, if any, from use of or contact with onsite surface water bodies which include the lake and small pond, as well as the back swamp in the wet season. Protect the environmental quality of these water bodies from degradation due to contaminants.

- Minimize the threat to public health from use of or contact with off-site surface water bodies which include the back swamp, the Upper Grand River, Grand River, Pat Bay, and Pat Bayou, and protect the environmental quality of these water bodies from degradation due to contaminants.

- Minimize the threat to public health from direct use of the shallow groundwater and protect the quality of the Plaquemine Aquifer and surface water bodies which might receive discharges from the shallow groundwater.

- Minimize adverse effects of present and potential users of the Plaquemine Aquifer from contaminants migrating from the site.

- Isolate contaminated materials from direct contact with surface soils and sediments to minimize migration of contamination.

- Limit the potential for air releases from the site which would have adverse effects on human health and limit onsite concentrations of hydrogen sulfide, cyanide, and other hazardous air pollutants to within OSHA standards.

Based on the data collected to date, active remediation will not be required to meet all of the objectives. The objectives serve as the basis for the environmental assessment in the remedial alternatives evaluation. By combining the applicable remedial action technologies and considering the pathways of migration in accordance with 40 CFR 300.68(f), 13 remedial alternatives were developed for the Bayou Sorrel Site. Table 1 lists the alternatives, along with the technologies they include, and the pathways of migration.

The remedial action alternatives developed included the following categories:

- No Action/Limited Action Alternatives
- Alternatives that Meet the Objectives of CERCLA
- Alternatives that Exceed All Applicable Standards
- Alternatives that Meet All Applicable Standards
- Alternatives that Address Offsite Disposal

TABLE 1

BAYOU SORREL SITE
LIST OF REMEDIAL ALTERNATIVES DEVELOPED FOR SCREENING

| Alternative | Description | Pathway of Contaminant Migration: Soil/Sediment Waste | Pathway of Contaminant Migration: Shallow Groundwater | Remedial Technologies Included |
|---|---|---|---|---|
| 1 | No Action | N/A | N/A | None |
| 2 | Limited Action | X | -- | Regrading, topsoil, seeding, offsite disposal of surface waste, fencing, burrowing animal control, groundwater monitoring, construction of diversion roadway to direct traffic around disposal areas. |
| 3 | Clay Cap (Onsite Materials) | X | -- | Regrading, cap, gas venting, topsoil, seeding, offsite/onsite disposal of surface waste, onsite disposal of contaminated soils, fencing, burrowing animal control, groundwater monitoring construction of diversion roadway to direct traffic around disposal areas. |
| 4 | Clay Cap (Offsite Materials) | X | -- | Regrading, cap, gas venting, topsoil, seeding, offsite/onsite disposal of surface waste, onsite disposal of contaminated soils, fencing, burrowing animal control, groundwater monitoring construction of diversion roadway to direct traffic around disposal areas. |
| 5 | Geomembrane Cap | X | X | Regrading, cap, synthetic membrane, drainage layer, gas venting, topsoil, seeding, offsite/onsite disposal of surface waste, onsite disposal of contaminated soils, fencing, burrowing animal control, groundwater monitoring construction of diversion roadway to direct traffic around disposal areas. |
| 6 | Geomembrane Cap with Slurry Wall | X | X | Slurry wall, regrading, pressure relief trench, seepage collection system, off-site disposal of seepage, cap, synthetic membrane, drainage |

Table 1 (cont'd)



| Alternative | Description | Pathway of Contaminant Migration: Soil/Sediment Waste | Pathway of Contaminant Migration: Shallow Groundwater | Remedial Technologies Included |
|---|---|---|---|---|
| | | | | layer, gas venting, topsoil, seeding, offsite/onsite disposal of surface waste, onsite disposal of contaminated soils, fencing, burrowing animal control, groundwater monitoring, construction of diversion roadway to direct traffic around disposal areas. |
| 7 | Offsite Material Cap with Slurry Wall | X | -- | Slurry wall, regrading, pressure relief trench, seepage collection system, off-site disposal of seepage, cap, gas venting, topsoil, seeding, offsite/onsite disposal of surface waste, onsite disposal of contaminated soils, fencing, burrowing animal control, groundwater monitoring, construction of diversion roadway to direct traffic around disposal areas. |
| 8 | Onsite RCRA Landfill | X | X | Waste removal, fill placement, membrane liner, leachate collection/detection system, cap, gas venting, topsoil, seeding, groundwater monitoring. |
| 9 | Offsite RCRA Landfill | X | X | Waste removal, haul to existing permitted offsite disposal facility, backfill, top soil, seeding, groundwater monitoring, slurry wall, injection well disposal. |
| 10 | Onsite Incineration | X | X | Waste removal, incineration, backfill, topsoil, seeding, groundwater monitoring, slurry wall, injection well disposal. |
| 11 | Offsite Incineration | X | X | Waste removal, haul to existing permitted incinerator, backfill, topsoil, seeding, groundwater monitoring, slurry wall, injection well disposal. |
| 12 | Onsite Biotreatment | X | -- | Waste removal, biological treatment of waste, sludge disposal, topsoil, seeding, groundwater monitoring, slurry wall, injection well disposal. |
| 13 | Land Treatment | X | -- | Waste removal, landfarming, backfill with treated soils, topsoil, seeding, slurry wall, injection well disposal. |

## INITIAL ALTERNATIVE SCREENING

Each remedial action alternative developed was evaluated and screened in accordance with the NCP 40 CFR 300.68 (g) and (h). The initial screening was based on the following criteria:

### Effectiveness

Each alternative was evaluated for its effectiveness in protecting public health, welfare and the environment.

### Engineering Feasibility

Each alternative was evaluated in terms of the site specific waste characteristics and the feasibility of the alternative to mitigate the site specific problems.

### Cost

Comparative cost estimates were prepared to assess the relative order-of-magnitude cost for each of the remedial alternatives.

Based on the initial screening of alternatives, the following alternatives were retained for detailed evaluation in accordance with the NCP, 40 CFR 300.68 (h).

- No Action
- Clay cap with onsite materials
- Geomembrane cap
- Geomembrane cap with slurry wall
- Source Removal with onsite incineration
- Source Removal with offsite disposal in a secure landfill

In addition to their alternatives listed above, the alternative recommended by ERM Southwest in the FS Report prepared for the BSTF was evaluated in detail.

Following the establishment of remedial objectives and development of general response actions to meet the objectives, remedial action technologies were developed within the general response actions. The general response actions and associated remedial technologies were evaluated primarily for technical feasibility relative to site characteristics, applicability, and also for the following criteria:

- Environmental
- Public health
- Institutional criteria
- Cost

Table 2 lists the general response actions considered and the associated remedial action technologies.

TABLE 2

BAYOU SORREL SITE
GENERAL RESPONSE ACTIONS AND ASSOCIATED REMEDIAL TECHNOLOGIES

| Response Action | Technologies |
|---|---|
| No Action | None |
| Limited Action | Some monitoring and regrading |
| Containment | Capping; groundwater containment barrier walls; bulkheads; gas barriers |
| Pumping | Groundwater pumping; liquid removal; dredging |
| Collection | Sedimentation basins; French drain; gas vents; gas collection system |
| Diversion | Grading; dikes and berms; stream diversion ditches; trenches; terraces and benches; chutes and downpipes; levees; seepage basins |
| Complete Removal | Drum grappling; excavation of soils, sediments and buried waste, pumping of surface water, removal of waste transport pipes |
| Partial Removal | Drum grappling; excavation of soils and sediments; removal of waste transport pipes |
| Onsite Treatment | Incineration; solidification; land treatment; biological, chemical, and physical treatment |
| Offsite Treatment | Incineration; biological, chemical, and physical treatment |
| In-Situ Treatment | Permeable treatment beds; bioreclamation; soil flushing; neutralization; landfarming |
| Storage | Temporary storage structures |
| Onsite Disposal | Landfills; land application |
| Offsite Disposal | Landfills; surface impoundments; land application; deep well injection |
| Alternative Water Supply | Cisterns; above-ground tanks; municipal water system; individual treatment devices |
| Relocation | Physical relocation of affected residents |

TABLE 3

BAYOU SORREL SITE

APPLICABLE REMEDIAL ACTION TECHNOLOGIES

| General Response | Technology |
|---|---|
| 1. No Action | None |
| | Monitoring |
| 2. Containment | CAPPING: |
| | Onsite Clay |
| | Offsite Clay |
| | Synthetic Membrane |
| | Multilayered System |
| | GROUNDWATER BARRIERS: |
| | Circumferential Placement of Soil-Bentonite Slurry Wall |
| | Cement-Bentonite Slurry Wall |
| | GAS BARRIERS: |
| | Synthetic (See Collection) |
| 3. Pumping | GROUNDWATER PUMPING: |
| | None |
| | LIQUID REMOVAL: |
| | None |
| | DREDGING: |
| | None |
| 4. Collection | SURFACE WATER: |
| | Seepage Basins |
| | Sedimentation Basins |
| | SUBSURFACE DRAINS: |
| | French Drains |
| | Dual Media Drains |
| | GAS: |
| | Passive Pipe Vents |
| | Passive Trench Vents |
| | Active Extraction |

| General Response | Technology |
|---|---|
| 5. Diversion | GRADING |
| | REVEGETATION:<br>Grasses<br>Certain Legume Species |
| | SURFACE WATER:<br>Dikes and Berms<br>Ditches, Trenches and Diversions<br>Seepage Basins<br>Sedimentation Basins<br>Levees<br>Floodwall |
| 6. Complete Removal | |
| | ALL CONTAMINATION:<br>Dragline<br>Backhoe<br>Industrial Vacuum<br>Drum Grappler |
| 7. Partial Removal | |
| | AREA OR CONCENTRATIONS |
| 8. Onsite and Offsite Treatment | |
| | INCINERATION:<br>Rotary Kiln |
| | SOLIDIFICATION<br>Lime Based |
| | LAND APPLICATION |
| | BIOLOGICAL TREATMENT:<br>Activated Sludge<br>Trickling Filters<br>Powdered Activated Carbon |
| | CHEMICAL TREATMENT:<br>Neutralization<br>Precipitation<br>Carbon Adsorption |

| General Response | Technology |
|---|---|
| | PHYSICAL TREATMENT:<br>Flow Equalization<br>Flocculation and Sedimentation<br>Oil/Water Separator<br>Air Stripping<br>Steam Stripping<br>Filtration<br>Sludge Dewatering<br>Removal |
| 9. In-Situ Treatment | CONTAMINATED MATERIALS:<br>Bioreclamation<br>Permeable Treatment Beds |
| 10. Storage | Temporary |
| 11. Onsite Disposal | Landfill |
| 12. Offsite Disposal | Landfill<br>Deep Well Injection |

Data collected during the RI were evaluated with respect to each technology to evaluate its site specific applicability. This evaluation was based on:

- Site geology, hydrogeology, and soils
- Waste characteristics (compatibility, ignitability, associated hazard)
- Technology performance and reliability
- Technology implementability (construction, operation and maintenance)

Site applicable remedial action technologies which survived the technology screening are listed in Table 3.

The applicable technologies were combined into comprehensive remedial action alternatives that will mitigate the threat to human health and environment posed by the site. The formulation and refinement of the remedial action alternatives follows the requirements of the NCP as set forth in 40 CFR 300.68 (f). Each alternative consists of one or more remedial activities which focus on achieving the remedial action objectives for the site.

As discussed earlier the objective of the remedial action alternatives at the Bayou Sorrel Site is to prevent or minimize the migration of contaminants from onsite sources and to prevent direct contact with the contaminated media. This objective addresses the following site-specific problems:

- Contaminated surface soils
- Shallow groundwater-possible present or future contamination
- Seeps in the existing cap area
- Waste outside the cap areas
- Cap erosion and inadequate cover
- Seasonal flooding of the area
- Inadequate site restriction

The methodology used to develop the remedial action alternatives for the Bayou Sorrel Site follows the structure presented in "Guidance on Feasibility Studies Under CERCLA," in accordance with the NCP. The steps consist of the following:

1. Identify Site Problems - The site problems and contamination exposure pathways are identified in the Endangerment Assessment (EA) and the Remedial Investigation (RI) reports.

2. Identify General Response Actions - Based on the information collected in the RI and the problems defined, general classes of response actions are identified. The response actions address the site problems and the cleanup goals and objectives.

3. Identify and Screen Technologies - Applicable technologies for each general response action are identified in the FS report. The site data is reviewed to aid in the identification of compatible technologies that are effective in mitigating the site-specific and waste-specific problems. The screening criteria for the technologies included environmental and public health effects, site-related considerations, and cost. Those technologies deemed incompatible, technically inappropriate, or cost prohibitive were eliminated from further consideration.

4. Develop Alternatives by Combining Technologies - The technologies which pass the screening process are assembled into alternatives which address the pathways of migration in accordance with 40 CFR 300.68 (d). The technologies are combined into alternatives based on acceptable engineering practice and project remediation goals. In accordance with 40 CFR 300.68 (f), the most applicable technologies are assembled into comprehensive remedial action alternatives for the site. This involves selecting remedial action for each pathway of migration and integrating them so that at least one remedial action alternative is developed for each of the following five categories:

a. No Action;

b. Offsite storage, destruction, treatment or secure disposal of hazardous substances at a facility approved under RCRA and all other applicable USEPA, State, and local standards;

c. Onsite remediation that attains all applicable or relevant Federal, State or local public health or environmental regulations, standards, guidelines and advisories;

d. Remediation that exceeds all applicable or relevant Federal, State, or local public health and environmental raegulations, standards, guidelines, and advisories; and

e. Remediation that meets CERCLA goals of preventing or minimizing present or future migration of hazardous substances and protects human health and the environment, without necessarily complying with other environmental and/or public health regulations.

The thirteen remedial alternatives that were developed for the Bayou Sorrel site were evaluated and screened in accordance with the NCP [40 CFR 300.68 (g) and (h)]. The initial screening was based on:

- The Effectiveness of the alternative in protecting public health, welfare and the environment;
- the engineering feasibility of the alternative, and
- cost of the alternative.

The alternatives which passed the initial screening were refined and developed in detail for costing purposes pursuant to the NCP [40 CFR 300.68 (h) (2) (i)]. The following criteria were utilized to technically evaluate each alternative.

- Performance
- Reliability
- Engineering Implementability/Constructability
- Public Health and Welfare
- Environmental Impacts
- Institutional Factors
- Costs

A description of the detailed evaluation screening criteria follows:

Performance

The performance criterion evaluates the alternatives in terms of their effectiveness and useful life. Effectiveness relates to how well the alternative meets the objectives of ultimate remediation to prevent or minimize release of contamination. Useful life relates to the period of time that the effectiveness can be maintained.

Reliability

The reliability of an alternative is assessed on the basis of operation and maintenance and demonstrated performance. Operation and maintenance considerations include labor availability, frequency, necessity, and complexity. Demonstrated performance is characterized by proven field performance, low probability of failure, and proven pilot scale testing.

Engineering Implementability/Constructability

The engineering implementability of each alternative is assessed based on ease of installation, time to implement the alternative, and time to achieve the benefits of the alternative. Constructability refers to the applicability of the alternative to site conditions, external conditions such as permits and access to disposal facilities, and equipment

availability. Time to implement includes time for treatability studies, design, and construction. Beneficial results are defined as a reduction of contamination or degree of exposure necessary to obtain remediation goals.

Public Health and Welfare

The public health and welfare criterion evaluates the safety of each alternative during construction and operation and upon failure. The evaluation covers safety of community, environment and workers during installation and operation. It also considers effects in the event of failure after remedial action implementation.

Environmental Impacts

The environmental impact criteria are evaluated in terms of short-term and long-term effects. The short-term effects are generally construction-related and refer to site pollution, site alteration, and construction debris. Site pollution refers to odor, noise, air emissions, surface water and/or groundwater contamination caused by construction activities. Site alterations relate to wildlife habitat alteration, historic site alteration, and disruption of households, businesses and services. The construction debris evaluation considers the amount and type of debris and requirements for disposal.

The long-term impacts are also evaluated for site pollution and site alteration. The site pollution criteria consider the odor, noise, air pollution, surface and/or groundwater contamination after remedial action implementation. Long-term site alteration considers wildlife habitat alteration, threatened and endangered species, use of natural resources, parks, transportation, and urban facilities; historic site alteration; relocation of households, businesses, and services; and aesthetic changes.

Institutional Factors

The institutional evaluation considers political jurisdictions, land acquisition, and land use and zoning. Alternatives are evaluated in terms of ease of satisfying applicable institutional criteria. In accordance with the NCP [40 CFR 300.68 (h) (2) (ii)], alternatives which pass initial screening must be technically and economically evaluated to develop the most cost-effective remedial alternative. To perform a detailed cost analysis, the various major components of each alternative must be evaluated and estimates of expenditures required to complete each measure developed in terms of capital and operation and maintenance costs. An indepth discussion of the evaluaton process can be found in Section 5 and Appendix C of the FS report. Table 5 provides information on capital costs and present worth of the remedial alternatives for the Bayou Sorrel site.

Consistency with other Environmental Laws

In accordance with 40 CFR 300.68 (f), the most applicable technologies are assembled into comprehensive remedial action alternatives for the site. This involves selecting remedial actions for each pathway of migration and integrating them so that at least one remedial action alternative is developed for each of the five categories:

a. No Action;

b. Offsite storage, destruction, treatment or secure disposal of hazardous substances at a facility approved under RCRA and all other applicable USEPA, State, and local standards;

c. Onsite remediation that attains all applicable or relevant Federal, State or local public health or environmental reagulations, standards, guidelines and advisories;

d. Remediation that exceeds all applicable or relevant Fedral, State, or local public health and environmental regulations, standards, guidelines, and advisories; and

e. Remediation that meets CERCLA goals of preventing or minimizing present or future migration of hazardous substances and protects human health and the environment, without necessarily complying with other environmental and/or public health regulations.

Within each category, remedial actions are developed which are cost effective, and have relatively high technical and public health and environmental value in comparison to other combinations of retained technologies.

TABLE 5

Capital Cost and Present Worth
for Remedial Alternatives
Bayou Sorrel Site

| Remedial Alternative | | Capital Cost** ($ Million) | Present Worth ($ Million) |
|---|---|---|---|
| A. | No Action | 0 | |
| B1. | Clay Cap | 15.3 | 21.3 |
| B2. | Geomembrane Cap | 16.7 | 22.2 |
| C. | Geomembrane Cap with Slurry Wall | 23.2 | 28.7 |
| D. | Onsite Incineration | | |
| | - 10 Year Term | 82.9 | 486.0 |
| | - 30 Year Term | 36.2 | 214.4 |
| E. | Offsite Disposal | 556.5 | 561.6 |
| F. | Recommended Alternative by ERM-Southwest | 16.6 | 22.7 |

The main environmental law pertaining to this site is RCRA. Four of the alternatives developed for the Bayou Sorrel site would comply with RCRA.

These are:

- Geomembrane Cap
- Geomembrane Cap with Slurry Wall
- Offsite RCRA Landfill, and
- On-site incinerator

For any alternative requiring off-site treatment or disposal, a facility in compliance with all applicable laws would be utilized. This would include such things as contaminated storm water or pore water to an injection well (UIC), excavated drums to a landfill (RCRA), etc.

The following elements are common to the three on-site alternatives developed in the FS.

o Regrading site to control runoff, limit cap erosion, limit surface water ponding and divert storm water from waste areas.

o Installation of a geofabric and sand drainage layer and collection system. A two percent crown would be established over the drainage layer using onsite unclassified soils. A clay cap constructed of onsite clayey soils would be placed over the unclassified soils in the crowned areas.

  Construction of the cap would involve the placement and compaction of about 24 inches of clay, maintaining the minimum 2 percent grade. The cap would be graded so that it would be crowned at the center and sloped to drain toward the perimeter at a minimum gradient of about 2 percent. This grade would maintain surface drainage to the cap perimeter while also allowing for settlement due to the compression of the underlying waste and soils. Providing a 2 percent gradient on the surface should increase the runoff coefficient, resulting in a reduced contact time and decreased infiltration.

o A 6-inch thick sand layer would be constructed on the surface of the compacted clay to allow for drainage of the topsoil. This layer would be drained by extending sand drainage channels beyond the capped areas.

o A geotextile filter layer would be installed over the drainage layer to prevent the drainage layer from becoming clogged with fines washed down from the topsoil.

o A system of pipes, manholes, pumps and ponds would be installed to collect and store the seepage from the lower drainage layer.

o The liquids collected would be transported and disposed of appropriately.

Elements common to both excavation alternatives evaluated by EPA are as follows:

- o A road berm would be constructed to elevation 10 to prevent flooding of the waste areas during excavation operations. A cement/ bentonite slurry wall would be installed to an elevation approximately 5 feet below the waste to be excavated. The purpose of this slurry wall would be to promote stability of the hole and to minimize inflow of groundwater during excavation.

- o A temporary waste storage/dewatering pad would be constructed, with a synthetic membrane over a graded onsite surface. The membrane would be covered with a minimum of 18 inches of sand and gravel which would serve as a leachate collection system. Sides of the membrane would be raised at the pad's perimeter to contain leachate.

- o A system of pipes, pumps, and ponds would be installed to collect and store the drainage from the excavation and the storage/dewatering pad. The contaminated water collection ponds would be situated south of the waste excavation areas. These ponds have been sized to contain the surface runoff from the site area during a 10 year, 6 hour design storm. The pond south of the landfill cells and Ponds 1 to 3 would contain about 4.5 million gallons of runoff and the pond south of Pond 4 would contain about 2 million gallons. The liquids collected would be transported and disposed of in a permitted injection well.

- o Excavation of waste and contaminated soils would be performed within the limits of the slurry wall. A bench would be left adjacent to the slurry wall on the inside of the excavation for structural support. Two to one side slopes would be retained below the bench to provide adequate stability against a slope failure into the excavation. Excavated waste would be placed on the storage pad for dewatering.

In addition to these elements, the offsite disposal and on-site incineration alternatives have elements unique to each alternative.

Source Removal with Offsite Disposal

- o The surface of the former waste disposal areas would be regraded to control runoff, limit cap erosion, limit surface water ponding, and divert storm water from the waste disposal areas.

- o A system of pipes, pumps, and ponds would be installed to collect and store the drainage from the excavation.

- o The excavated wastes would be tranported to an offsite permitted RCRA compliant secure facility for ultimate disposal by landfilling. Treatment of the wastes with a 10 percent mixture of lime, kiln dust, or similar material, may be necessary for proper material handling and stability, to facilitate transportation and disposal operations, and to comply with restrictions against land disposal of wastes containing free liquids.

- During installation of the clay cap, a gas venting would be installed to reduce the buildup of system methane and other gases beneath the cap. The vented gases would be treated by installation of carbon canisters and periodic air sampling would be performed to evaluate the need for continued or additional treatment.

- The capped areas would be covered with 12-18 in. of topsoil from a suitable onsite borrow area, and seeded to reduce erosion. Installation of non-woven fabric mat may be used in certain areas to reduce the erosion potential prior to establishment of vegetation.

- All miscellaneous wastes outside the capped area, i.e. waste transport pipes, waste storage drums from the RI, etc. would be collected and either hauled offsite to a permitted landfill or placed under the capped area, along with any contaminated soils or waste identified during the remediation.

- All regraded areas would be surrounded with a 6-foot high chain link fence to restrict disposal area access.

- Groundwater monitoring of the shallow and deep aquifers would be performed on a semi-annual basis for a period of at least 30 years. The monitoring system will be based on existing site data and current RCRA guidance. The groundwater would be monitored for contaminants previously identified at the site and contaminants expected as a result of the materials disposed of at the site.

- Gravel access roads would be constructed completely around all fenced areas to allow continued recreational use of the adjacent lands and Borrow Lake while diverting the traffic around and away from the disposal areas themselves.

The geomembrane cap alternative, in addition to the items listed above, would include a minimum 30 mil thick HDPE geomembrane over the clay layer of the cap.

The geomembrane cap with slurry wall alternative consists of the measures described for the geomembrane cap alternative with the addition of a slurry wall around the capped areas. This alternative also includes a pressure relief drain system inside the slurry wall to provide an outlet for increased pore water pressure caused by settlement of the cap or seasonal groundwater elevation changes. A system is also included to collect, store and dispose of the seepage collected.

- Upon completion of the excavation in one area, the excavation would be dewatered and backfilled with soil borrowed on site. The backfill would be properly placed and compacted to provide a stable, uniformly graded surface.

- Upon completion of the backfilling operations, the surface would be graded, a seed bed prepared, and appropriate seed sown.

- A short-term monitoring program of the shallow groundwater should be performed on a semi-annual basis for a period of three years. Wells would be installed at the former disposal areas to monitor the performance of source removal.

The following elements are unique to the on-site incineration alternative:

- Wastes would be allowed to dewater on a covered storage pad area, prior to incineration.

- The wastes would be transported to feed hoppers for the onsite incinerator and then burned. The onsite incinerator would be covered to facilitate continuous operation even during the rainy season. The ash would be cooled and disposed of in a state permitted solid waste facility. Cooling of the ash would be accomplished with a Tube Cooler, which is a water-based heat exchanger which prohibits contact of the water with the ash. The water would be cooled using a cooling tower and clarified prior to re-use in a concrete lined settling basin. Because of the nature of the onsite wastes no significant reduction in total volume is anticipated.

- As the process of excavation continued, the excavation would be backfilled with onsite soils borrowed from adjacent areas. The backfill would be properly placed and compacted to provide a stable, uniformly graded top surface. Careful handling of the staged excavation and backfilling process would be required to prevent re-contaminating the backfilled soils. In addition, a sump would be required at an elevation lower than the backfilled area to prevent saturating the soils with contaminated water. The actual sequence and sizing of these operations and facilities would be performed during the design phase.

- Upon completion of the backfilling operations, the surface would be graded, a seed bed prepared, and appropriate seed sown.

- A short-term program of monitoring the shallow groundwater would be performed on a semi-annual basis for an anticipated period of three years. Wells would be installed at each of the disposal areas to monitor the performance of source removal.

Recommended Alternative

40 CFR 300.68 (J) (NCP) States:

"The appropriate extent of remedy shall be determined by the lead agency's selection of the remedial alternative which the agency determines is cost effective (i.e. the lowest cost alternative that is technologically feasible and reliable and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, or the environment)". In addition, EPA policy requires that, as a general rule, a selected alternative remedy attain applicable or relevant standards, with certain exceptions, including interim remedies. Based upon the evaluation of the RIFS, EPA has determined that onsite disposal with a geomembrane cap and a slurry wall around the old landfill areas and pond 4 meets the NCP criteria found at 40 CFR 300.68. This will be the minimum remedy that EPA would accept following negotiations with Responsible Parties for the Bayou Sorrel site.

As discussed in the RI and FS, direct use of shallow groundwater in the area is not documented and contamination of shallow groundwater has possibly occurred but at low levels (<100 ppb) and does not appear to be wide spread. Also, the deeper (Plaquemine) aquifer is under free-flowing artesian condition which results in an upward hydraulic gradient (and resulting upward flow) through overlying soils. Therefore, contaminant transport will be limited to diffusion, which is generally very slow.

To ensure that contaminants are not leaving the former waste disposal areas via the shallow groundwater and to ensure that the Plaquemine aquifer does not become contaminanted, a comprehensive groundwater monitoring program will be conducted. A "trigger" mechanism will be included so that additional remedial actions will be taken if it becomes necessary.

At a minimum, monitoring will continue for 30 years and a decision on the necessity for continued monitoring will be made prior to the end of the 30 year period.

Compliance with Section 121 of the Superfund Amendments and Reauthorization Act of 1986

Under §121 (b)(1) "remedial actions in which treatment which permanently and significantly reduces the volume toxicity, or mobility of the hazardous substances, pollutants, and contaminants is a principle element, are to be preferred over remedial actions not involving such treatment".

RODs signed within 30 days of enactment of SARA must comply to the maximum extent practicable with §121 of CERCLA (§121(g)).

The selected remedy for the Bayou Sorrel site includes a RCRA compliant cap, slurry walls around the most contaminated disposal areas, and extensive groundwater monitoring (described in the next section). In the process of selecting the remedial alternative, a number of remedies were examined in accordance with the National Contingency Plan, 40 CFR 300.68, and either screened or retained for final evaluation under 40 CFR 300.68(h). Although the remedial alternatives were evaluated and a selection made before the enactment of §121 of CERCLA, the screened alternatives would also not be appropriate under the requirements of the current law.

The following examines the rationale used in screening remedial alternatives for the site under the NCP, 40 CFR 300.68, and whether this method resulted in the selection of an appropriate remedy for meeting the intent of §121 of CERCLA to the maximum extent practicable. Those remedies which were evaluated in accordance with the requirements of 40 CFR 300.68(g) "Initial Screening of Alternatives", and are permanent remedies within the intent of §121 of CERCLA, or were retained and evaluated under 40 CFR 300.68(h) "Detailed Analysis of Alternatives" are included.

Permanent remedies evaluated in the Feasibility Study which would comply with the intent of §121:

- †Biological Treatment
- †Land Treatment
- Offsite Incineration
- Onsite Incineration

Remedies which reduce mobility:

- Clay Cap
- Cap with Slurry Walls

Remedies Consistent with the NCP, but which do not comply with §121:

- Excavation and Off Site Disposal

† did not pass intial screening under 40 CFR 300.68(g)

Source Removal with Onsite Biological Treatment

Source Removal with Onsite Land Treatment

These alternative were not retained after screening under 40 CFR 300.68(g). However if effective, both would remove the organic constituents of the waste onsite and so provide permanent remedies.

As viable treatment alternatives, biotreatment and landfarming have not been shown to be effective treatment technologies for the wastes onsite, the probability of failure of either remedy resulting from wastes not amenable to such treatments is high. However, §121(b)(2) states that "the President may select an alternative remedial action meeting the objectives of this subsection whether or not such action has been achieved in practice at any other facility or site that has similar characteristics." A broad interpretation of this section may not allow the probability of failure as sufficient reason for "initial screening" of the alternatives.

§121(b)(1)(D) requires that the remedy take into account "short and long term potential for adverse health effects from human exposure." All of the alternatives that provide source removal require the exvacation of the wastes onsite. During treatment, excavation of the contaminated soils would significantly increase the risks to public health from exposure, and additionally increase the probability of a release from the site.

The biotreatment and landfarming were estimated to require 40 years or more for completion. During these periods wastes would be excavated significantly increasing the risk associated from the site. In light of the risk of failure of these remedies and the greater risks both provide. The promulgation of §121 would not necessitate additional scrutiny of these alternatives.

Excavation with Onsite or Offsite Incineration

These alternatives were not selected as the site remedy under 40 CFR 300.69(i). Both would provide permanent remedies for the site.

Offsite incineration is comparable to onsite incineration, but would create added risks of exposure while the wastes were being transported and require an extended treatment period, approximately 80 years.

Onsite incineration is a proven technology which would permanently destroy the organic constituents of the wastes and therefore reduce the toxicity and mobility of the contaminants. The remaining ash would still have considerable volume and may remain a hazardous waste since metals are present onsite. Incineration of the million cubic yards of wastes would require from 10 years (6 incinerators) to 30 years (2 incinerators) respectively. During this period there would be a significant increase inpotential for adverse health effects from human exposure to the excavated wastes and possible accidential disruption of the incineration leading to increase in the risk of hazardous emmissions.

Incineration increases the risk of exposure to the wastes and to hazardous emmissions for an extended period of time. Additionally, there is the chance that after treatment a hazardous waste would still remain which would require disposal. Incineration as a treatment alternative for this site would not be a required alternative under §121 of CERCLA.

Excavation and Offsite Disposal in a Permitted RCRA Facility

This alternative was not selected as the site remedy under 40 CFR 300.68(i).

Under §121(b)(1), the offsite transport and disposal of hazardous materials without permanent treatment technologies should be the least favorable alternative remedial action where practicable treatment technologies are available. This remedy is therefore unacceptable where other alternatives are available.

RCRA Compliant Clay Cap

RCRA Compliant Clay Cap with Slurry Walls

A RCRA compliant cap and slurry walls with an extended monitoring program was the selected remedy under 40 CFR 300.68(i). The contaminants will remain onsite, and therefore under §121(c) the remedy will have to be reviewed "no less often than every 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remdial action being implemented.

Wastes onsite were stabilized with cement kiln dust and lime, and mixed with large volumes of soil. This decreased the mobility of the wastes and reduced the relative toxicity from direct contact with them.

A cap would greatly reduce infiltration from rainwater preventing offsite migration of the contamination. The addition of slurry walls would isolate the wastes, further reducing the possibility of migration into the offsite shallow groundwater. Extensive monitoring associated with the selected remedy would illuminate problems enabling corrective action to be taken expediently.

The remedial investigation for the site did not indicate offsite migration. Endangerment is associated with the potential for a release and direct contact with the wastes. The soils underlying the site are extremely impermeable, successfully limiting migration from the site with only the current closure. Presently, as there is no detected offsite contamination, no Louisiana Environmental Statutes are being violated. All applicable or relevant and appropriate standard, requirement, criteria, or limitations shall be complied with as required for a remedy in which wastes remain onsite under §121(d).

Permanent remedies for the site were screened during the selection process outlined in the NCP 40 CFR 300.68. However, since the permanent remedies for the site do not meet the requriements of §121(b), advent of the new law does not necessitate reevaluating the remedy selection in order to comply with the congressional intent of selecting permanent remedies when it is practicable.

A capping remedy with slurry walls complies to the maximum extent practicable with §121 of CERCLA and therefore is an appropriate remedy for selection within the 30 day period following enactment of SARA as required in §121(g).

# COMMUNITY RELATIONS RESPONSIVENESS SUMMARY ON PREFERRED REMEDIAL ALTERNATIVE BAYOU SORREL SITE, IBERVILLE PARISH, LOUISIANA

This community relations responsivenes summary is divided into the following sections:

I. Overview - This section discusses EPA's preferred alternative for remedial action, and likely public reaction to this alternative.

II. Background on Community Involvement and Concerns - This section provides a brief history of site background and community interest and concerns raised during remedial planning activities at the Bayou Sorrel site.

III. Summary of Major Comments Received During the Public Comment Period and the EPA Responses to Comments

## I. OVERVIEW

In the presentation for the public meeting on February 26, 1986, EPA discussed the remedial alternatives which were examined in the Feasibility Study for addressing the contamination at the Bayou Sorrel site.

After the initial screening of the alternatives, a detailed evaluation was performed on the seven remaining. Except for the no action alternative, all met basic criteria for protecting public health and the environment and all had common components. The alternatives are:

| | | |
|---|---|---|
| 1. | No Action | Est. Cost: - 0 - |
| 2. | Clay Cap | Est. Cost: $ 15.3 Million (capital)<br>$ 21.1 Million (present worth) |
| 3. | Clay Cap with Geomembrane | Est. Cost: $ 16.7 Million (capital)<br>$ 22.4 Million (present worth) |
| 4. | Geomembrane Cap with Slurry Wall | Est. Cost: $ 23.2 Million (capital)<br>$ 28.9 Million (present worth) |
| 5. | Source Removal with Onsite Incineration (10-year timeframe) | Est. Cost: $ 87.7 Million (capital)<br>$ 329.2 Million (present worth) |
| | (30-year timeframe) | Est. Cost: $ 37.9 Million (capital)<br>$ 155.6 Million (present worth) |
| 6. | Source Removal with Offsite Disposal | Est. Cost: $ 536.2 Million (capital)<br>$ 540.5 Million (present worth) |
| 7. | Clay Cap with Deep Leachate Collection System | Est. Cost: $ 16.2 Million (capital)<br>$ 21.5 Million (present worth) |

Based upon the evaluation of the Remedial Investigation and Feasibility Study (RI/FS), the EPA has determined that onsite disposal with a geomembrane cap and a slurry wall around the most contaminated areas is the corrective action of choice. This remedy meets the NCP criteria found in 40 CFR 300.68, and would be the minimum remedy that the EPA would accept following negotiations with Responsible Parties for the Bayou Sorrel site. EPA anticipates that this remedy will meet with a favorable reaction from the public.

## BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

### Site Background

The Bayou Sorrel site is approximately 20 miles southwest of Baton Rouge, about 6 miles northwest of the town of Bayou Sorrel. The site is also known locally as "Grand River Pits," due to its proximity to the Upper Grand River on the north. Fifty of the site's 265 acres received wastes. Disposal areas consisted of four liquid waste ponds, four landfills (at least one of which contains drums), and one land farm. Data from water and sediment samples of a 50-acre lake and a one-acre pond on the edge of the site indicate that they were probably borrow pits and not used for disposal. Disposal operations began in early 1977. In the summer of 1978, a truck driver died at the site when liquid wastes dumped from his truck reacted with contents of the receiving pond to create lethal hydrogen sulfide gas. A State of Louisiana District Court ordered the site closed in late 1978. Closure activities, completed in spring 1979, consisted of dewatering, filling, and capping the open ponds. After closure, the State of Louisiana continued to receive complaints about odors and surface contamination in the swamp south of the site. Based on information from investigations performed by the State in 1981 and 1982, the Bayou Sorrel site was added to the Superfund National Priorities List (NPL) in July 1982.

### Major Concerns and Issues

Community involvement relating to the Bayou Sorrel site has been strong. Public interest in the site appears to have begun in early 1978. At that time, the Iberville Parish Police Jury notified the Louisiana State Department of Health of its strong objection to the disposal of wastes at the facility. The State Department of Health responded with a letter to the site operators notifying them that disposal of wastes was permitted only with department approval for each specific waste load.

Several local residents formed the Concerned Citizens of Bayou Sorrel in early July 1978. Their first meeting dealt primarily with odors and potential contamination from the hazardous waste injection well located in the town of Bayou Sorrel. Approximately 75 people attended this first meeting. Public concern and interest were substantially elevated when a truck driver was killed at the site on July 25, 1978. A second meeting of the Concerned Citizens of Bayou Sorrel was held in early August of 1978 and was attended by over 200 area residents. Interest of the group expanded to include cleanup of the Bayou Sorrel site (at that time, this group called the site "Grand River Pits").

In the fall of 1978, the only bridge leading to the site was burned to prohibit truck access. An area newspaper alleged that the fire was a result of area residents' frustration with what they perceived as inaction by the State of Louisiana.

In response to continuing citizen complaints, the State of Louisiana. in 1981, conducted a preliminary site investigation and installed wells for long-term monitoring. After the EPA listed the site on its National Priorities List, the Iberville Parish Police Jury passed a resolution to support clean up activities of the Bayou Sorrel site.

In 1979, more than 150 people living in the area filed a civil suit against the owners of the injection well and the Bayou Sorrel site, charging that both had been a nuisance for years and that fumes from the open pits had harmed residents' health.

Activities to Elicit Input and Address Concerns

The Louisiana Department of Environmental Quality (LDEQ) assumed lead responsibility from the Louisiana Department of Health. They responded to numerous telephone calls from area residents concerning the injection well and the Bayou Sorrel site. Subsequently, the EPA conducted site inspections pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

The EPA issued a press release on March 19, 1984, announcing the start of extensive remedial investigation and feasibility studies (RI/FS). At that time, the Work Plan was made available to the public at the three established strategically located respositories, for their review and study.

Subsequent to the end of the RI/FS, the EPA issued a press release to announce a public meeting held on February 26, 1986, in the Police Jury Room of the courthouse in Plaquemine, Louisiana. This meeting was held to discuss the cleanup alternatives for surface and groundwater contamination at the site.

A public comment period was established from February 12, 1986 through March 5, 1986, during which both oral and written comments were received by the EPA.

Continuing meetings have been held with the Responsible Parties at the Bayou Sorrel site.

## III. SUMMARY OF PUBLIC COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD AND AGENCY RESPONSES.

This public comment period on the Feasibility Study for the Bayou Sorrel Superfund site was originally scheduled from February 12 to March 5, 1986. The last day to receive comments was officially extended to March 15. A public meeting was held on February 26, 1986, in Plaquemine, Louisiana with approximately 80 people in attendance and 22 of those making oral statements or asking questions. Five written statements were received during the comment period. A summary of these comments is provided below.

In addition to the public meeting, a briefing was held for local officials on February 26, 1986. Present at this meeting were officers and members of the Iberville Parish Police Jury and representatives of the Louisiana Department of Environmental Quality, along with EPA and its consultants. The Bayou Sorrel Feasibility Study alternatives were presented to members of the Iberville Parish Police Jury and the possible implementation of the selected remedy by potentially responsible parties was discussed.

Comment #1

(United States Department of the Interior, Fish and Wildlife Service
Mr. Willie Hurdle - Iberville Parish Police Jury)

The U.S. Department of the Interior, Fish and Wildlife Service stated that since the site is surrounded by open water and baldcypress/tupelogum swamp with high fish and wildlife value, since the site is inundated during high water periods, since large amounts of hazardous wastes are at the site, and since the site is only a few feet above the normal water table they recommend that at a minium the geomembrane cap and slurry wall remedy be implemented at the Bayou Sorrel site.

EPA response to comment number #1

The geomembrane cap and slurry wall is one of the on-site remedies currently being considered by EPA. However, the remedial investigation conducted at the Bayou Sorrel site has not confirmed that waste constituents are migrating from former disposal areas via groundwater. EPA feels that a clay cap with a slurry wall around the former land fills and pond 4 only is sufficient to protect human health and the environment. This remedy will also include a mechanism in the monitoring program to determine definitely whether migration is or is not occuring and if so the extent of migration and the effect the migration might have on public health and the environment. If such a remedy is implemented by responsible parties, this mechanism would be included in a legal consent instrument and would allow for additional remedial measures if necessary.

Comment #2

(Ecology Center of Louisiana, Dr. Velma Campbell)

The above comments oppose an on-site remedy (clay cap, geomembrane cap, or geomembrane with slurry wall) because of one or more of the items listed below.

These commentors feel that an in-place remedy is unsatisfactory because:

- If constituents leak from the former waste disposal area, contaminants will not be detected until after materials have escaped containment.
- The monitoring program will end before any contaminants are likely to escape.
- If any contaminants are found in groundwater river or swamps, it would be blamed on the site if wastes remain at the site.
- It is not credible to suggest that any entity will monitor to perpetuity.
- Clay cap alternatives are not disposal alternatives but rather long-term storage.
- Deed restrictions would remove the land from recreation, commerce, development, and natural processes of evaluation.
- The State or community would be left with the long-term burden of oversight.
- Capping as ultimate remediation worsens the original situation because it enshrines in legal agreements the existing non-viable situation it is designed to correct.
- The Louisiana Legislature has determined that the southern part of Louisiana is unsuitable for hazardous waste disposal. Land disposal is to be phased out by 1991. It is inapproprate to propose a remedy that would be illegal if it were a commercial operator.
- The area around the Bayou Sorrel Site is hydrogeologically active and interconnected. In situ percolation rates suggest that the site may leak in terms of feet per year rather than fractions of inches.

EPA Response to Comment #2

The RI/FS conducted at the site by EPA does not indicate that any extensive movement of contamination has occurred. However, the monitoring program designed for any in situ remedy would be designed so that any movement of waste constituents from the containment areas would be detected early. This monitoring plan would have a "trigger mechanism" to ensure that additional remedial work is undertaken if significant contamination is detected.

Even though the monitoring program described in the FS is for a minimum of 30 years, EPA would reevaluate any monitoring program prior to expiration to determine if additional monitoring is necessary.

The site monitoring program will be designed to ensure that contaminants are unable to migrate to surface water (i.e. swamp, lake or river) undetected.

Any monitoring progam implemented at the site by PRPs in conjunction with an onsite remedy will be included in a legal instrument to ensure that monitoring is conducted as scheduled.

Even though an onsite remedy would not result in destruction of wastes and waste constituents, the geology at the site is such that waste migration would not be extensive. The deed restrictions that will be included in an onsite remedy would not entirely remove the Bayou Sorrel site from recreation, commerce, and development. It will of course, limit access to the site, especially the former waste disposal areas, and limit other activities conducted at the site. This will include preventing direct contact with waste disposasl areas, and activities that would disturb the cap and other elements of an onsite remedy.

There is also concern that the State or local community would be left with the burden of long term oversight. EPA will ultimately be responsible for any oversight of remedial activities or maintenance and monitoring activities. As in other areas of environmental concern and at other sites, EPA would rely on the expertise of State officials and other local environmental and health agencies as necessary. In sites where federal money is used for remedial action, CERCLA requires, prior to providing these remedial actions that the State enter into a contract or cooperative agreement providing assurances that the State will assure maintenance for the expected life of the action.

Capping as ultimate remediation will not worsen the existing situation by enshrining in a legal agreement the non-viable situation it is designed to correct. The legal agreement utilized to memorialize any remedial action agreement with PRPs, will instead ensure that after remedial action at the site, conditions do not revert to the current conditions. After superficial remedial work at the site in 1978 and 1979, no provisions were made to ensure that the site cover was maintained and no monitoring of groundwater was included.

Comment #3

[Dr. Velma Campbell]

This commentor proposes remediation involving removal of waste for long term proper storage or destruction because:

1. The land would be restored to a useful condition for commerce, recreation delveopment or nature. Also, nearby property values would be preserved.

2. Facilities developed or converted for management of hazardous waste may be utilized in the future for other purposes. Construction, conversion and operation of these facilities would provide jobs for a wide variety of local work force.

Two examples of this type of remedial action provided by this commentor are:

1. Modify existing, underutilized storage facilites to contain the Bayou Sorrel wastes and construct new facilities for long term storage.

2. Dispose of waste and wastes by offsite incineration in facilities likely to be available in the next two years.

3. Utilize kilns licensed and operating for the processing of recoverable waste products.

EPA's Response to Comment #3

EPA, in its FS, has evaluated the offsite incineration remedy suggested by this commentor and found it to be much less cost effective and time effective than other onsite and off-site remedies. Based on an estimated volume of 1,000,000 cubic yards of waste and contaminated material at this site, it could take eighty years to complete this remedy.

The long term storage proposed by this commentor would not only drastically increase the cost of an ultimate remedy but would also increase the exposure to the environment because of the additional handling, and transportation.

EPA is not aware of the kilns licensed and operating for the processing of recoverable waste products discussed in this comment. Even if these kilns were available locally,the volume and nature of the Bayou Sorrel wastes would be prohibitive to this type of operation. First of all, there is a wide range of wastes that were mixed at the Bayou Sorrel site. These include pesticides, petroleum refinery wastes, petrochemical wastes, and other industrial wastes. It would be virtually impossible to recover portions of this mixture. Compounding the problem is the method of waste stabilization that was used when the site was originally closed in 1978-79. The wastes were at that time mixed with large quantities of soil and other stabilizing agents. The total volume of waste/contamimated soil is estimated to be 1,000,000 cubic yards.

Also, this commentor discusses the possibility of storing the Bayou Sorrel wastes to allow access to the materials for research into chemical mix behavior or so that commerical ventures may be developed to extract valuable components from the waste mixture. Again, the extensive quantity of the soil-waste mixture would prohibit these uses and because of the nature of the mixture, as discussed above, it would be virtually impossible to separate the waste components. Likewise, it is not likely that this large quantity of hazardous waste mixture would ever be used for research purposes. Even so, some form of ultimate disposal would be necessary at some point in time.

Comment #4

[Dr. Velma Campbell]

This commentor suggests that further chemical analysis of wastes and characterization of wastes for suitability of disposition is necessary.

EPA Response to Comment #4

While EPA performed limited analyses of waste during its site Remedial Investigation, sufficient information is available concerning the nature of the wastes at the Bayou Sorrel site. Extensive information concerning categories of waste and specific wastes at the Bayou Sorrel site is available in the form of site records, information provided by companies in 104(e) responses, and other documents. Also, State employees have provided EPA with invaluable information from first hand observations of site activities during actual operations and during closure operations in 1978 and 1979. State personnel were on site regularly during closure of the site and have provided information to EPA concerning locations of waste, stabilization techniques, etc. EPA does not feel that additional sampling and analyses of waste is necessary.

Comment #5

[Michael Tritico - RESTORE]

This commentor feels that the danger at the Bayou Sorrel site has not been properly documented. Specifically this commentor mentions that there are not enough monitoring wells testing enough strata and for enough chemicals to be certain that heads of plumes have been located nor to demonstrate the direction and speed of movement.

EPA Reponse to Comment #5

Since 1981, a total of 23 monitoring wells have been installed at the Bayou Sorrel site and groundwater samples analyzed. Four of these wells penetrate into the deeper plaquemine aquifer and the remainder are screened in the shallow alluvial aquifer. Results of analyses of these monitoring

wells (including recent Remedial Investigations conducted by EPA and the Bayou Sorrel Task Force) do not indicate that there is extensive migration of waste constituents from former waste disposal areas. Each sample was analyzed for the 129 inorganic and organic constituents each time. Each of these monitoring wells has been situated so that former waste disposal areas are virtually surrounded and the direction of any migration would be detected.

Comment #6

[Michael Tritico - RESTORE]

This commentor does not want delays in solving the problem because the Bayou Sorrel site is often flooded, is subject to catastrophic scouring during a leve crevasse, will be submerged year round within a hundred years, is hydraulically connected with local aquifers, and toxic materials cannot be left in situ because they will not stay in situ.

EPA Response to Comment #6

EPA also feels that expeditious remedial action at this site is appropriate. We are aware that delays have come up during investigative work at the site but prior to initiating any remedial action at a Superfund site, EPA is obligated to define the extent of the problem and select the cost effective remedy that will protect human health and the environment. Evidently, this commentor equates "solving the problem" with the total removal and disposal or treatment of the waste and related contaminated soil at the Bayou Sorrel site. EPA is aware of the problems of frequent flooding, potential of catastrophic scouring in the event of a levee crevasse and that sea level around the world is rising. Each of these considerations will be addressed individually and collectively during the design of the remedy and monitoring program at the Bayou Sorrel site.

Even though the Bayou Sorrel Site is connected with local aquifers, the characteristics of the soils at the site are such that migration of hazardous constituents from former waste disposal areas will be minimal. No contamination of the Plaquemine (deeper) aquifer has been detected; contamination is not expected because of the upper hydraulic pressure of this aquifer.

Some waste constituents have been detected in the shallow aqufer but at low levels (<100 ppb) and mostly in isolated instances (i.e. no evidence of leachate plumes. The concern that toxic materials cannot be left in place because they will not stay in place is unfounded. Results of extensive sampling (EPA, State, and PRPs) of monitoring wells, soil, surface water, and biota at the site indicate that the waste is staying in place. The long-term monitoring and maintenance that would be included in any onsite remedy would ensure that the integrity of remedial actions is maintained and enable EPA to determine the extent and direction of any contaminant migration.

Comment #7

[Michael Tritico-RESTORE]

This commentor feels that artesian pressure from below and inundative pressures from above will continue the spread of dangerous materials until those materials are removed.

EPA Response to Comment #7

The studies conducted at the Bayou Sorrel site do show that the hydraulic gradient of the lower (Plaquemine) aquifer is above land surface most of the year. However, EPA feels that this condition, instead of dispersing waste constituents, would prevent migration of these waste constituents downward to the Plaquemine aquifer. The inundative pressures from above" would be prevented from contacting the wastes and contaminated soil by means of a clay cap. The design of this cap would be such that not only would surface water be prevented from contacting the waste or contaminated soil by a clay cap and geomembrane liner, but surface water would also be prevented from contacting the cap by a layer of topsoil and a sand drainage layer above the clay cap. There will also be a drainage layer below the cap that will collect any waste leachate caused by the artesian pressures of the Plaquemine Aquifer along with pore water generated because of the weight of the cap causing settling.

Comment #8

[Michael Tritico-RESTORE]

This commentor suggests that a slurry wall does not seal from below nor above nor from the side in the case of a levee crevasse. Also, a slurry wall must be keyed into a suitable aquiclude and none exists at the site.

EPA's Response to Comment #8

EPA agrees that a slurry wall does not seal from the top nor bottom; the function of a slurry wall is to prevent lateral migration of contaminated groundwater or leachate. If a slurry wall were utilized at this site, it would be designed so that lateral migration would not occur. This would include installation of the wall below the bottoms of waste disposal areas and would cut off the more permeable lenses beneath the site. Upward migration of contaminated groundwater would be collected by the drainage system beneath the cap and would be prevented by the cap system itself.

Concerning the issue of no suitable aquiclude at the site, EPA studies have shown that the soils underlying the Bayou Sorrel site are of sufficiently low permeability to prevent significant downward migration. This, coupled with the artesian pressure of the lower aquifer, would act to preclude downward migration of contaminated groundwater, as discussed in the Response to Comment #1.

However, the RI conducted at the Bayou Sorrel site did not confirm that waste constituents are migrating from the former waste disposal areas via groundwater, and a slurry wall is not necessary around the entire site.

Comment #9

[Michael Tritico - RESTORE]

Indications from preliminary monitoring data have not been correlated with data indicating that chlorinated hydrocarbon and an alkaline influence are destructive to clay soils. This comment was evidently based on a three page letter report (attached to the commentor's letter) concerning sodium hydroxide effects and ethylene dichloride light end wastes effects on in situ clay. This comment was also made by Mr. Tritico at the February 26, 1986 public meeting.

EPA Response to Comment #9

In this commentor's oral comments at the February 26 public meeting he mentioned that at the Bayou Sorrel site there are pH's approaching 10 and chlorinated hydrocarbon reported in large quantities.

EPA is not aware of any chlorinated hydrocarbons being reported in large quantities during the RI at this site, nor in other studies conducted by the LDEQ and the PRPs. Concentration of chlorinated hydrocarbons were generally less than one part per million (ppm). The report submitted by Mr. Tritico was a laboratory test conducted for a specific site using soil from that site. The test was conducted using ethylene dichloride (EDC) light end wastes; the report does not give the concentration of EDC, but it is assumed that it would approach 100%. Since concentrations of chlorinated hydrocarbons at the Bayou Sorrel site are <1 ppm, comparison of the characteristics at Bayou Sorrel to results of this report would not be appropriate.

The report submitted by Mr. Tritico also dealt with laboratory tests of effects of sodium hydroxide (Na OH) on in situ clay permeability. This report discusses that the clays from the test site were destroyed by saturating with a 50% Na OH solution; this saturation raised the pH of the test soil to 13 before destruction of the clay occurred.

The highest pH measured at the Bayou Sorrel site during studies conducted by EPA, LDEQ and PRPs appears to be 9.5 (this was of waste in disposal ponds prior to the 1978-79 closure of the site) except for two isolated monitoring well samples by PRPs in 1984.

Since the report included with Mr. Trictico's letter is based on a "worst case" situation concerning pH and chlorinated hydrocarbons, it is impossible to infer the effect that the low chlorinated hydrocarbon concentrations and much lower pHs that exist at the site may have on in situ clays. In any event, the monitoring program at the site will allow EPA to constantly evaluate the migration of contaminants from the former waste disposal areas.

Comment #10

[Michael Tritico - RESTORE]

This commentor suggests that "a thoroughly inadequate amount of attention has been given to the "removal alternative". Mr. Tritico suggests that the wastes be transported by barge to GSU's Riverbend Nuclear Station at Starhill, Louisiana. There, the commentor proposes, the waste could be processed using the plasma torch technology, with small volumes of ash and salt remaining. If the plasma torch method does not fully degrade the contaminated material, the commentor recommends that other techniques could be applied such as radio frequency heating, high temperature fluid wall reactor, infrared incinerator, supercritical water oxidation, molten salt or molten glass technologies set up alongside each other and operated as a flexible system.

EPA Response to Comment #10

In evaluating alternatives for the Bayou Sorrel site, EPA retained two "removal" alternatives for detailed evaluation. These alternatives (off-site disposal at a RCRA facility and onsite incineration) are discussed in detail in the Feasibility Study developed by EPA. Transportation alternatives for the offsite disposal included barge transport as Mr. Tritico mentioned. The waste treatment alternatives proposed by Mr. Tritico were not evaluated by EPA, however, because these alternatives are not proven technologies. The National Contingency Plan (40 CFR 300.68(h)(2)(i)) requires that EPA place "... emphasis on use of established technology" in its detailed analysis of alternatives.

Also, Mr. Tritico mentions that volumes of ash and salt remaining will be minimal. Because of the physical state of wastes remaining at the Bayou Sorrel site, this is not a valid statement. When the site was closed in 1978-79, wastes remaining at the site were stabilized using soil and other addatives such as kiln dust and portland cement. Volume reduction by incineration or other thermal treatment would be, at best, minimal and volume could possibly increase due to fluffing of the treated material during the treatment process.

Comment #11

Police Jury - Iberville Parish; Walter Allen - Concerned citizens of Bayou Sorrel.

These commentors ask the question "Who are the members of the Bayou Sorrel Task Force?"

EPA Response to Comment #11

As EPA discussed at the February 26, 1986 public meeting, the Bayou Sorrel Task Force (BSTF) is composed of a group of Potentially Responsible Parties who voluntarily banded together to negotiate with EPA concerning remedial activities at the Bayou Sorrel site. The BSTF, independent of EPA, has conducted its own RI/FS at the site and has expressed a willingness to implement their recommended alternatives (a clay cap remedy similar to EPA's clay cap alternative).

Comment #12

Iberville Parish Police Jury, Walter Allen - Concerned Citizens of Bayou Sorrel, Andrea Allen.

These commentors asked "Who determines what is cost effective?"

EPA Response to Comment #12

The National Continagency Plan requires that in selecting a remedial alternative for a site, the decision maker (in the case of Bayou Sorrel, the Regional Administrator) among other things, to take into consideration the cost of implementing the remedial actions including operation and maintenance costs. An alternative that far exceeds the costs of other alternatives and does not provide substantially greater protection of public health or the environment should be excluded. The NCP requires that the Agency select the cost effective alternative that effectively mitigates and minimizes threats to and provides adequate protection of public health and welfare and the environment considering cost, technology and reliability of the remedy. The Regional Administrator will make this decision based on information provided in the RI/FS and other information provided by EPA staff and consultants.

Comment #13

Iberville Parish Police Jury, Walter Allen - Concerned Citizens of Bayou Sorrel, Andrea Allen, Leslie Ann Kirkland

The above commentors asked the question "Will local people have any input into the remedial alternative selection?"

EPA Response to Comment #13

As discussed at the public meeting, the purpose of the public comment period and public meeting is to receive comments on the Feasibility Study. The review and comment period precedes selection of the remedial response and the summary of public comments is one of the documents utilized by the decision maker in selecting the appropriate remedy for any particular site.

Comment #14

[Concerned Citizens of Bayou Sorrel, Iberville Parish Police Jury]

These commentors requested an extension of time for submission of comments on the Feasbility Study.

EPA Response to Comment #14

EPA agreed at the February 26 Public meeting to extend the public comment period from March 5 to March 15, 1986.

Comment #15

[Dale Bouquet - Iberville Parish Police Jury, Walter Allen - Concerned Citizens of Bayou Sorrel]

These commentors requested that EPA provide financial aid to Iberville parish so that the parish attorney and Parish engineer can be involved in investigations at the Bayou Sorrel site. Also, these commentors requested that EPA provide money to assist in a Parish investigation of soil and water (at the site).

EPA Response to Comment #15

Section 104 of the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA) provides that where it is determined that a State or political subdivision of a State has the capacity to carry out any or all of the actions authorized under Section 104 of CERCLA, EPA may enter into a Contract or Cooperative Agreement with that entity to take those actions using fund monies. In the fall of 1982, the Louisiana Department of Natural Resources (now Department of Environmental Quality) requested that EPA enter into such a Cooperative Agreement for the RI/FS at the Bayou Sorrel site. EPA allocated money for the State to conduct these studies contingent upon no responsible parties being willing to undertake remedial activities at the site. No responsible party was willing to voluntarily undertake remedial activities. However, the State subsequently withdrew its application for a Cooperative Agreement and EPA proceeded with the RI/FS.

These commentors are requesting fund monies so that the parish can be involved in the investigation at the Bayou Sorrel site and also conduct its own studies. EPA feels that the studies authorized by Section 104 of CERCLA have been completed and at this point no further investigation is needed. The next step in the remedial process, as outlined in the NCP, is Remedial Design. EPA plans to negotiate with the Bayou Sorrel PRPs for the Remedial Design and also the following phase, Remedial Action (construction). All these actions, if implemented by the PRPs, will be directly overseen by EPA and its representatives.

Comment #16

[Iberville Parish Police Jury, Walter Allen President - Concerned Citizens of Bayou Sorrel]

This comment questions whether the remedial alternatives described in the FS apply to only the former waste disposal areas or whether they also apply to any areas where wastes have migrated from the waste disposal areas.

EPA Response to Comment #16

As explained in the FS, there are some isolated areas where surface contamination has been documented. These areas are in the vicinities of former waste disposal areas and may be due to either seepage or spillage during 78-79 closure activities. These areas will all be included in the ultimate remedy for the Bayou Sorrel site. For the geomembrane cap alternative this contaminated soil would be placed under the cap above the former waste disposal areas.

Comment #17

[Iberville Parish Police Jury, Walter Allen, PRESIDENT - Concerned Citizens of Bayou Sorrel, Andrea Allen]

These commentors questioned how long the waste at Bayou Sorrel will remain toxic.

EPA Response to Comment #17

With the geomembrane cap remedy, the wastes and contaminated soil would be protected from natural destruction mechanisms such as oxidation, sunlight, aerobic microorganisms, and other elements. Even though there will be some degradation of those wastes it will be minimal; therefore, the wastes, for all practical purposes, would remain toxic forever.

Comment #18

(Iberville Parish Police Jury, Walter Allen, President - Concerned Citizens of Bayou Sorrel]

These commentors are concerned with what chemicals are on site and what impact will leaving those chemicals on site have on the area.

EPA Response to Comment #18

As discussed in the FS, the wastes disposed of at the Bayou Sorrel site generally fall into one of the following three categories:

1. Process wastes from pesticide/herbicide manufacturing including distillation residues, contaminated packaging, and miscellaneous wastes.

2. Sulfide-containing wastes (scrubber blowdown and spent caustic) from hydrocarbon processing and exploration activity.

3. Spent wash solutions from boiler-cleaning and process equipment-cleaning contractors.

Soil sampling results indicate that the former ponds contain an assortment of organic compounds, including herbicides and pesticides. During its investigation of the site EPA has developed an extensive list of compounds that may have been disposed of at the Bayou Sorrel site. Since many of these compounds may not be hazardous wastes or hazardous substances and since these compounds may decompose with time into other compounds, EPA analyzed all samples for the full list of 129 priority pollutants.

As discussed in previous comments, leaving these wastes in place should not adversely affect the areas. EPA will require long term monitoring and maintenance to ensure that hazardous substances are not leaving the site.

Comment #19

[Iberville Parish Police Jury; Walter Allen, President - Concerned Citizens of Bayou Sorrel]

Several commentors were concerned with various aspects of access/development restrictions such as: will development on and around the site be limited; how will people be kept off site; will site be safe to hunt and fish after remediation; etc.?

EPA Response to Comment #19

Each of the onsite alternatives has the same security features as part of the long term monitoring and maintenance activities. These include a six foot high chain-link fence around the capped areas, gravel access roads around the fenced areas to encourage persons on the site to go around rather than over capped areas, and signs warning of the waste disposal areas. Inspection and repair of these security features will be an integral part of the operation and maintenance of this site.

Comment #20

[Iberville Parish Police Jury, Walter Allen, Concerned Citizens of Bayou Sorrel, Mr. Bouquet]

This group of commentors is concerned with liability for this site once the Remedial Action is completed. Specific questions asked include: what happens if contaminantion occurs after cleanup? Are the Iberville Parish Police Jury and State responsible? Will money be available for future testing of soil, groundwater, etc.? If so, for how long and how much per year?

EPA Response to Comment #20

As we discussed at the public meeting, EPA plans to negotiate with PRPs for voluntary implementation of the remedy at the Bayou Sorrel site. If these negotiations are successful, EPA will require that the PRPs conduct long term monitoring and maintenance at the site. If the wastes remain at the site, the PRPs would retain liability for problems that develop in the future at this site; this future liability is included in the Consent Decree.

If Federal funds were to implement Remedial Action at this site, the State would have to provide all future maintenance of the remedial action for tne expected life of the remedy. This would not mean that the State would assume liability for the site, but would assume responsibility for maintenance.

Future testing of media at the site will be the responsibility of the PRPs pursuant to the Consent Decree. EPA of course, would oversee this sampling, including analysis of a limited number of samples for verification of accuracy of PRP analyses. It is impossible, however, to determine how much money per year will be available and for how long it will be available.

Comment #21

[Mrs. Oswald P. Templet, Mr. John J. Battieste]

These commentors own property and/or have water supply wells in the area of Bayou Sorrel and are concerned that wastes may have migrated off-site.

EPA Response to Comment #21

In conducting the Remedial Investigation, two of the main concerns at the Bayou Sorrel site were that waste constituents might leave the former disposal pit via ground water or surface water. Both of these pathways of migration have been sampled extensively by EPA, LDEQ and PRPs and no offsite migration of contamination has been detected. Also, as discussed in previous responses, both these pathways of migration will continue to be monitored as part of the long term operation and maintenance after completion of the remedy.

Comment #22

[Mr. Roy Zito, Mr. Darrel Stevens - Citizen Activists Against Pollution]

These commentors were concerned that organisms living at the site might be contaminated or become contaminated in the future.

EPA Response to Comment #22

Organic analysis was performed on tissue samples of catfish, bream, crayfish tail meat, and crayfish green gland, all collected onsite. Fish samples were collected from the borrow lake and small onsite pond, and crayfish from numerous shallow standing water areas onsite. No organic compounds of non-biological origin were found in any sample, and inorganic results were typical for uncontaminated tissue. Continued monitoring of organisms onsite will be included as part of the long term operation and maintenance of the remedy.

Comment #23

[Walter Allen, President - Concerned Citizens of Bayou Sorrel, Andrea Allen]

These commentors had specific questions concerning site conditions and certain aspects of the remedial alternatives. These questions included: What is a slurry wall? How deep is the proposed slurry wall? How deep were wood fragments found at the site? Will wood fragments cause a conduit through the soil when the wood decomposes.

EPA Response to Comment #23

The slurry wall proposed for the Bayou Sorrel site is of the soil bentonite type. In this type of slurry wall, a trench (approximately 3 ft. wide) is excavated around the waste disposal areas to a specified depth.

The spoils from this trench are then mixed with bentonite (a form of clay) and pushed or pumped back into the trench. The clay absorbs water and swells resulting in a low permeability underground containment wall around the waste disposal areas. The purpose of the slurry wall is to prevent groundwater from migrating into or out of the waste disposed areas. The depth of the slurry walls at the Bayou Sorrel site would vary according to depth of waste, areas of higher permeability etc., but would generally be 30-40 feet deep.

Concerning the depth of wood fragments at the site, soil borings were done across the entire site, some to a depth of 80 feet. Indications are that 25 or 30 feet was the deepest locations where wood fragments were found. There is no indication that wood fragments at this site would form major conduits for migration of contaminated ground water, since in place permeability tests at this site included many of the bore holes where wood fragments were found.

Comment #24

[Robert Mooney - Plaquemine City Coucil]

This commentor was concerned with two aspects of groundwater migration at the Bayou Sorrel Site:

1. Laboratory determination vs field determination of soil permeability and,

2. Hydraulic balance at or near the site may change.

EPA Response to Comment #24

EPA agrees with this commentor that there may be differences in permeability determined in this field vs Laboratory. However, based on data collected by EPA and others concerning permeability at the site, EPA feels that there is low potential for groundwater migration at the site. In studies done at this site, both methods of determining permeability have been used for comparison. The reason for this is there are arguments that each method may be more accurate than the other. Utilizing all available permeability data and the fact that no significant contaminant migration in groundwater has been detected, EPA feels that soils at this site are of sufficient impermeability to prevent contaminant migration in groundwater.

EPA also agrees that the Hydraulic Balance may change at the site. This is one of the items that will be monitored at this site and if data indicate that additional corrective actions may be necessary in the future, EPA could then ensure the implementation of that action.

Comment #25

[Jesse Wilson - Iberville Parish Police Jury, Andrea Allen]

These commentors asked what would constitute a true emergency at the Bayou Sorrel site and whether EPA has a funding mechanism to handle emergencies.

EPA Response to Comment #25

In determining the appropriate extent of action to be taken at a given site, EPA reviews all site data to determine if a Remedial Action is appropriate. If it is determined that there is an immediate risk to public health or welfare or the environment, the EPA may take action to control the threat. Criteria used to evaluate a site for a removal action include:

1. Contamination of drinking water supplies;
2. Hazardous substance, etc. stored in bulk container;
3. Threat of fire or explosion;
4. High levels of hazardous substances, etc. in soils at or near the surface that may migrate;
5. Exposure to hazardous substances, etc. by nearby populations, animals or food chains.

The removal action may be conducted either by utilizing Superfund money, or whenever possible, by the Responsible Parties.

Comment #26

[Mr. Milton Vaughn]

This commentor is concerned with the effect that buried containers which might rupture would have on releasing contaminants to the groundwater.

EPA Response to Comment #26

One area of the Bayou Sorrel site was utilized specifically for drum disposal. Through our extensive field investigations and record reviews (including information provided by LDEQ), we have determined that most containers disposed of at the site were emptied and crushed prior to disposal. Another area of the site was rumored to have received filled drums but investigation (magnetometer survey) failed to confirm the presence of drums in that area.

Comment #27

[Mr. Milton Vaughn, Mr. Rod Ritterman, Mr. Walter Allen]

These commentors expressed concerns with monitoring wells and oil wells at the site. One of these commentors wanted to know what keeps contamination from following the well bore and contaminanting, the (Plaquemine) aquifer. Another wanted to know if the integrity of monitoring wells onsite is checked as an injection well is checked. The third concern deals with the effect that an existing oil well on the site would have on waste migration.

EPA Response to Comment #27

In any field investigation at a hazardous waste site where soil borings of any type are conducted, every precaution is taken not to contaminate any areas because of improper constructions of the boring (or well). EPA and contractors in the hazardous waste field typically utilize some form of sealer between the borehole and well casing. This sealer is normally a cement-bentonite mixture placed in the void from above the screening material to the ground surface. In the case of bore holes that are not cased as monitoring wells, the bore holes are usually grouted to the surface with the same mixture. This grout mixture will prevent contamination from migrating downward along the bore hole.

EPA does not test the integrity of its monitoring wells as is done with injection wells. Injection wells are normally operated under very high pressure, with liquids being forced into the ground by this high pressure, whereas monitoring wells are for the purpose of removing ground water from the ground, usually by means of a bailer or some form of pump and would not stress this well casing. However, visual inspections will be made of monitoring wells as part of the overall monitoring plan and data will be continually evaluated which in itself could indicate problems with specific wells.

The oil well found on site is located in the borrow lake away from contaminated areas and should not be affected by waste from the site. In any event, the well has been abandoned and is no longer in use.

Comment #28

[Mr. Milton Vaughn, Mr. Wilson, Andrea Allen, Robert Mooney, Darrel Stevens]

These commentors had several comments dealing with the problems of installing a clay cap in southern Louisiana, one being that the clays in the area are "fat" clays which upon drying out will shrink and crack. Another is that the area where the site is located is subject to frequent flooding and water would come up underneath the cap.

EPA Response to Comment #28

Any cap installed at the Bayou Sorrel site will be designed to alleviate the problems mentioned by the above commentors. Any clay soil has a tendency to shrink and swell in relation to the moisture content of the soil. This problem will be addressed in two ways at the Bayou Sorrel site. First, the cap is designed so that it is protected by sufficient topsoil and vegetation to prevent dessication of the clay. Secondly, the long term monitoring and maintenance will provide for periodic visual inspections of the capped areas so that potential problem areas could be detected. Also, the geomembrane layer over the clay will assist in preventing dessication and will provide an extra impermeable layer in the event the clay cap does fail.

The cap itself will be designed so that any flood waters encroaching on the site would not pond on capped areas. The cap will be keyed a few feet into the native clays at the site so that flood waters cannot enter under the cap. In the event any surface waters were able to contact wastes, any contaminated water would be collected by the drainage layer installed directly over the waste.

Comment #29

[Nolan Henson, Mr. Bouquet]

These commentors were concerned that the proximity of the Bayou Sorrel site to the Atchafalaya River Flood Protection levee might cause problems either because the levee might be moved closer to the site or there could be a catastrophic levee failure near the site.

EPA Response to Comment #29

EPA is not aware that the Corps of Engineers is planning to move the levee closer to the Bayou Sorrel Site. If this were to happen and if it did affect the Bayou Sorrel site, there would be a gradual change and any problems would be detected through the long term monitoring and maintenance program.

Concerning the catastrophic failure of the levee, this problem will have to be taken into consideration during the design phase of the remedy. The cap could be designed to withstand this sort of catastrophic failure if it were to happen.

Comment #30

The majority of commentors at the public meeting and those submitting written comments favored the removal alternatives at the Bayou Sorrel site. This would involve excavation of the wastes and contaminated soil for transportation to a secure, RCRA compliant landfill.

EPA Response to Comment #30

Although this Remedial Alternative would be an effective, reliable method of site remediation, there would still be major problems and efforts associated with this remedy. This alternative would increase the short term risk to site workers, the environment, and public health since waste would be excavated and exposed prior to transportation to an offsite disposal area. Also, there would be an increased risk from traffic accidents due to the number of truckloads of waste that would be hauled from the site.

Also, cost would be an important consideration with this remedy. Because of the enormous volume of material to be excavated, transported and disposed of the cost for this remedy would be over $500 million. Since this extensive a remedy is not necessary at the Bayou Sorrel site to protect human health and the environment, this would not be the most cost effective remedy.

Comment #31

Several commentors were concerned with the injection well and associated pits located near the Town of Bayou Sorrel approximately 6 miles from the site. Most wanted an investigation and monitoring of this facility, including cleanup of the abandonded pits located at the well.

EPA Response to Comment #31

The injection well at Bayou Sorrel is an active facility that is currently regulated pursuant to the Resource Conservation and Recovery Act (RCRA) and the Safe Drinking Water Act.

Current regulations require that prior to issuance of a RCRA permit, any former disposal areas at a facility must be addressed. Also prior to issuance of a RCRA permit, a public meeting must be conducted to receive input from the public.

Comment #32

[Bayou Sorrel Task Force]

On-site incineration and off-site landfill disposal are inappropriate remedial technologies for the site. They place the population in needless risk of traffic injury and exposure to wastes, overwhelm limited landfill capacity and do not provide incremental benefits to balance these negative effects.

EPA Response to Comment #32

EPA agrees that On-site incineration and off-site landfill disposal are not the most cost effective alternatives which protect human health and the environment. EPA is no longer considering these two remedies.

Comment #33

[Bayou Sorrell Task Force]

There is no demonstrated groundwater contamination at the site at the present time which requires slurry wall construction. The risks of slurry wall construction are considerable, the costs of wall construction are unpredictable, and the effectiveness of a completed slurry wall is not assured.

EPA Response to Comment #33

Even though extensive contamination of groundwater at the Bayou Sorrel site has not been demonstrated, organic analytical results indicate the possibility of organic contamination of shallow groundwater. This contamination is at low levels and does not appear to be widespread.

Based on this data and the fact that the soils in the vicinity of the site are relatively impermeable, EPA feels that a slurry wall around the entire site is not necessary at this time. However, a mechanism would be included in the consent document to require implementation of additional remediation should contamination be detected in groundwater through the monitoring program. This will be included as part of the overall monitoring. Data generated through this program can be evaluated after a period of years to determine if additional remediation is necessary.

Comment #34

[Bayou Sorrel Task Force]

The caps designed for capping alternatives are too massive for site conditions. They contain two unnecessary sand layers and are too great in areal extent. Unnecessary and extensive settlement will occur from the weight of the installation if the EPA cap design is implemented.

EPA Response to Comment #34

EPA is aware of the soil conditions at the site and the problems with settling at the site. These problems can be overcome through design of the cap, with features such as preloading for settlement prior to beginning actual cap construction. This cap design is necessary to prevent surface water from contacting wastes and contaminated soil along with prevention of direct contact with waste by people or wildlife. The two sand layers are included in the cap design as drainage layers. The sand layer immediately above the waste can be modified to include less sand and an additional geofabric layer for pore water drainage. The first is to be located directly above waste and below the cap. This layer would intercept pore water squeezed out of the soil by cap settlement and allow it to be collected for disposal. The second sand layer is to be placed above the clay cap and geomembrane and below the top soil layer. This sand layer would prevent surface water from reaching the cap.

Comment #35

[Bayou Sorrel Task Force]

The caps designed for the cost evaluation of capping alternatives contain needless costly design elements, i.e., a surface water run-off collection pond, security during construction, an on-site laboratory, a below grade barrier to burrowing animals and a passive gas vent system which are not protective of human health and the environment.

EPA Response to Comment #35

While the features mentioned above may be replaced by other means of control, the functions they are designed to address are necessary. For example, if people are protected from direct contact with hazardous substances or other dangers during construction, a security guard may not be necessary. Each of these elements that the Bayou Sorrel Task Force feels are "needless" can be addressed during the Remedial Design phase prior to implementation of the remedy.

Comment #36

[Bayou Sorrel Task Force]

The cost of a geomembrane is stated as being insignificant to the total cost of a cap. Inclusion of a geomembrane escalates remediation costs an additional $1.2 million and provides only a minimal addition level of assurance against infiltration compared to the clay cap alternative.

EPA Response to Comment #36

Generally, the geomembrane cap alternative meets the current RCRA guidance and this alternative represents in-place closure in accordance with current RCRA regulations and guidance. This geomembrane layer would effectively isolate the contamination from direct contact and, in addition, add an extra layer of impermeability to effectively control infiltration and waste seepage. In addition, this geomembrane would add an extra measure of protection if the clay cap failed due to differential settling or other problems.

Comment #37

[Bayou Sorrel Task Force]

Post-closure ground water monitoring is proposed to be semi-annual for 30 years. Semi-annual monitoring in early years is appropriate because of the possibility of altering ground water velocities during and immediately following construction. In later years when ground water velocities return to their very slow rates, semi-annual monitoring is not appropriate.

EPA Response to Comment #37

As the above commentor states the post-closure monitoring period is for a minimum period of thirty years. Even though the FS calls for semi-annual monitoring, this frequency could be reduced, depending on data collected during the monitoring program.

Comment #38

[Bayou Sorrel Task Force]

The Task Force does not agree with much of the EPA cost estimating assumptions and methodology. However, for comparison purposes only, properly using that methodology on the BSTF cap design results in a capital cost estimate that is 8% less than the lowest cost EPA capping alternative. This lower figure is based on (A) not changing the BSTF 190 mil geofabric to a composite geofabric/geo-net/geofabric and (B) not using an erosion control mat on the gently sloped 4% edges of the BSTF cap. The clay cap remedial alternative designed and configured in the Bayou Sorrel Task Force Feasibility Study remains a remedial alternative that effectively mitigates threat to, and provided adequate protection of, public health and welfare and the environment.

EPA Response to Comment #38

EPA does not feel that the clay cap alternative proposed by the Bayou Sorrel Task Force provides adequate protection to public health and the environment. Many details of cap construction will need to be worked out during the design phase of remediation Design modification may be made that will save money, but in no case will these modifications be allowed to erode the integrity of the cap design.

Comment #39

[Louisiana Department of Environmental Quality]

The Louisiana Department of Environmental Quality (LDEQ) contends that, all other things being equal, the most desirable action of the Bayou Sorrel site is total removal or distruction of wastes. The LDEQ states that if an on-site remedy is selected, precautions should be taken to ensure that waste or constituents are not released. It is recommened that the areas of the old pits on site be included in a slurry wall and the cap design recommended by the BSTF be utilized to minimize the amount of settling.

EPA Response to Comment #39

EPA feels that the removal and destruction options are not cost effective remedies at the Bayou Sorrel site. EPA has had subsequent discussions with LDEQ personnel and has further reviewed comments provided by the BSTF. Based on this information, EPA and the State agree that modifications can be made to EPA's geomembrane cap design that will decrease the overall weight of the cap but will not affect the efficiency of the cap. Also, EPA and LDEQ personnel agree that a slurry wall is not necessary at this time except in the vicinity of the old landfill cells and pond 4 area. The monitoring program would be extensive and not only would allow for early detection of waste migration but would include a mechanism to require additional remedial action if necessary.